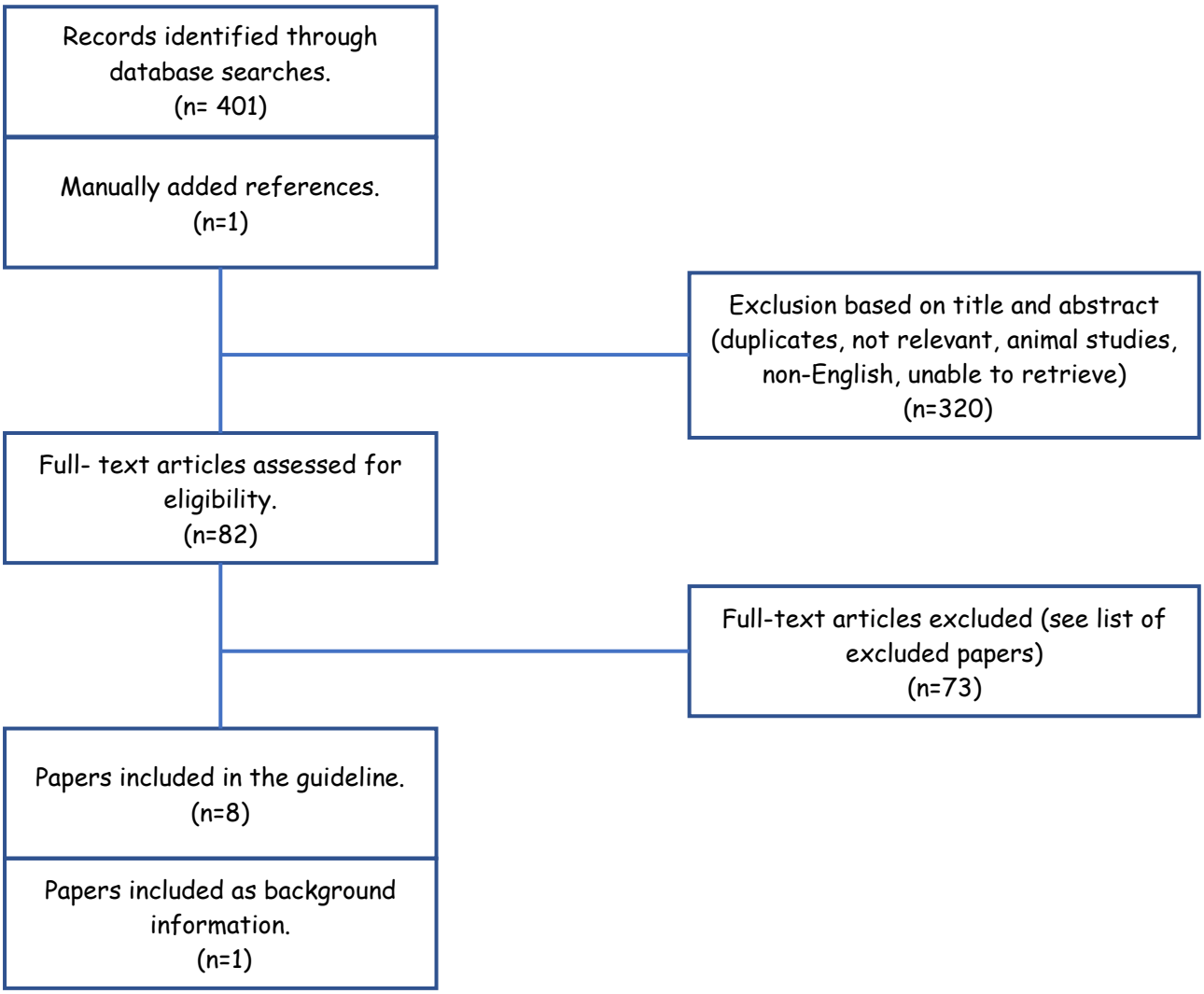
Annex 8: Number of embryos to transfer - Literature study report

PICO 1: Which pregnancy-related risks should be considered before the transfer of more than one embryo?

Search strings

PUBMED	("Fertilization in vitro" [MeSH] AND "Sperm Injections, Intracytoplasmic"[Mesh] OR IVF OR ICSI OR "in vitro fertilization" OR "intracytoplasmic sperm insemination" OR "intracytoplasmic sperm injection" OR "fertilization in vitro" OR "in vitro fertilisation" OR "fertilization in vitro") AND ("Pregnancy, Multiple "[Mesh] OR "Multiple Birth Offspring"[Mesh] OR "multiple birth" OR "high-order multiple" OR "high-order gestation") AND (Singleton* OR "single birth") AND("Obstetrics"[Mesh] OR "Delivery, Obstetric"[Mesh] OR "obstetric*" OR "maternal height" OR "uterus operation" OR "uterus malformation" OR "uterus anomal*" OR "caesarean scar" OR " previous preterm delivery" OR " cervical treatment" OR "heterotopic pregnancy")
COCHRANE	(IVF OR ICSI OR "in vitro fertilization" OR "intracytoplasmic sperm insemination" OR "intracytoplasmic sperm injection" OR "fertilization in vitro" OR "in vitro fertilisation" OR "fertilization in vitro") AND ("multiple pregnancy" OR "Multiple Birth Offspring" OR "multiple birth" OR "high-order multiple" OR "high-order gestation") AND (Singleton OR "single birth") AND("Obstetrics" OR "maternal height" OR "uterus operation" OR "uterus malformation" OR "uterus anomaly" OR "caesarean scar" OR " previous preterm delivery" OR " cervical treatment")

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Almog B, Levin I, Wagman I, Kapustiansky R, Lessing JB, Amit A, Azem F. Adverse obstetric outcome for the vanishing twin syndrome. Reproductive biomedicine online 2010;20: 256-260.	Relevant intervention is not included
2	Barlow P, Lejeune B, Puissant F, Englert Y, Van Rysselberge M, Degueldre M, Vekemans M, Leroy F. Early pregnancy loss and obstetrical risk after in-vitro fertilization and embryo replacement. Human reproduction (Oxford, England) 1988;3: 671-675.	Relevant intervention is not included
3	Buckett WM, Chian RC, Holzer H, Dean N, Usher R, Tan SL. Obstetric outcomes and congenital abnormalities after in vitro maturation, in vitro fertilization, and intracytoplasmic sperm injection. Obstetrics and gynecology 2007;110: 885-891.	Relevant intervention is not included
4	Carpinello OJ, Casson PR, Kuo CL, Raj RS, Sills ES, Jones CA. Cost Implications for Subsequent Perinatal Outcomes After IVF Stratified by Number of Embryos Transferred: A Five-Year Analysis of Vermont Data. Applied health economics and health policy 2016;14: 387-395.	Relevant intervention is not included
5	Chen M, Heilbronn LK. The health outcomes of human offspring conceived by assisted reproductive technologies (ART). Journal of developmental origins of health and disease 2017;8: 388-402.	Relevant intervention is not included
6	Chen X, Liu P, Sheng Y, Li W, Tang R, Ding L, Qin Y, Chen ZJ. The impact of unicornuate uterus on perinatal outcomes after IVF/ICSI cycles: a matched retrospective cohort study. The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet 2019;32: 2469-2474.	Relevant patients are not included, or only as subgroup
7	Dare MR, Crowther CA, Dodd JM, Norman RJ. Single or multiple embryo transfer following in vitro fertilisation for improved neonatal outcome: a systematic review of the literature. The Australian & New Zealand journal of obstetrics & gynaecology 2004;44: 283-291.	Relevant intervention is not included
8	De Sutter P. Single embryo transfer (set) not only leads to a reduction in twinning rates after IVF/ICSI, but also improves obstetrical and perinatal outcome of singletons. Verhandelingen - Koninklijke Academie voor Geneeskunde van Belgie 2006;68: 319-327.	Relevant intervention is not included
9	Dhont M, De Sutter P, Ruyssinck G, Martens G, Bekaert A. Perinatal outcome of pregnancies after assisted reproduction: a case-control study. American journal of obstetrics and gynecology 1999;181: 688-695.	Relevant patients are not included, or only as subgroup

10	Dickey RP, Xiong X, Gee RE, Pridjian G. Effect of maternal height and weight on risk of preterm birth in singleton and twin births resulting from in vitro fertilization: a retrospective cohort study using the Society for Assisted Reproductive Technology Clinic Outcome Reporting System. Fertility and sterility 2012;97: 349-354.	Relevant intervention is not included
11	Dickey RP, Xiong X, Xie Y, Gee RE, Pridjian G. Effect of maternal height and weight on risk for preterm singleton and twin births resulting from IVF in the United States, 2008-2010. American journal of obstetrics and gynecology 2013;209: 349.e341-346.	Relevant intervention is not included
12	Evans MI, May M, Drugan A, Fletcher JC, Johnson MP, Sokol RJ. Selective termination: clinical experience and residual risks. American journal of obstetrics and gynecology 1990;162: 1568-1572; discussion 1572-1565.	Relevant patients are not included, or only as subgroup
13	Fauque P, Jouannet P, Davy C, Guibert J, Viallon V, Epelboin S, Kunstmann JM, Patrat C. Cumulative results including obstetrical and neonatal outcome of fresh and frozen-thawed cycles in elective single versus double fresh embryo transfers. Fertility and sterility 2010;94: 927-935.	Relevant intervention is not included
14	Filicori M, Cognigni GE, Gamberini E, Troilo E, Parmegiani L, Bernardi S. Impact of medically assisted fertility on preterm birth. BJOG : an international journal of obstetrics and gynaecology 2005;112 Suppl 1: 113-117.	Relevant patients are not included, or only as subgroup
15	Forman EJ, Hong KH, Franasiak JM, Scott Jr RT. Obstetrical and neonatal outcomes from the BEST Trial: single embryo transfer with aneuploidy screening improves outcomes after in vitro fertilization without compromising delivery rates. American journal of obstetrics and gynecology 2014;210: 157.e151-157.e156.	Relevant intervention is not included
16	Guesdon E, Vincent-Rohfritsch A, Bydlowski S, Santulli P, Goffinet F, Le Ray C. Oocyte donation recipients of very advanced age: perinatal complications for singletons and twins. Fertility and sterility 2017;107: 89-96.	Relevant intervention is not included
17	Hourvitz A, Pri-Paz S, Dor J, Seidman DS. Neonatal and obstetric outcome of pregnancies conceived by ICSI or IVF. Reproductive biomedicine online 2005;11: 469-475.	Relevant intervention is not included
18	Isaksson R, Gissler M, Tiitinen A. Obstetric outcome among women with unexplained infertility after IVF: a matched case-control study. Human reproduction (Oxford, England) 2002;17: 1755-1761.	Relevant intervention is not included
19	Jaspal R, Prior T, Denton J, Salim R, Banerjee J, Christoph L. The impact of cross-border IVF on maternal and neonatal outcomes in multiple pregnancies: Experience from a UK fetal medicine service. European journal of obstetrics, gynecology, and reproductive biology 2019;238: 63-67.	Relevant intervention is not included
20	Jauniaux E, Ben-Ami I, Maymon R. Do assisted-reproduction twin pregnancies require additional antenatal care? Reproductive biomedicine online 2013;26: 107-119.	Relevant intervention is not included
21	Jing S, Li XF, Zhang S, Gong F, Lu G, Lin G. Increased pregnancy complications following frozen-thawed embryo transfer during an artificial cycle. Journal of assisted reproduction and genetics 2019;36: 925-933.	Relevant intervention is not included
22	Källén B, Olausson PO, Nygren KG. Neonatal outcome in pregnancies from ovarian stimulation. Obstetrics and gynecology 2002;100: 414-419.	Relevant patients are not included, or only as subgroup
23	Kamath MS, Sunkara SK. Perinatal outcomes after oocyte donation and in-vitro fertilization. Current opinion in obstetrics & gynecology 2017;29: 126-130.	Relevant patients are not included, or only as subgroup
24	Kamphuis EI, van Wely M, Repping S, van der Veen F, de Groot CJ, Hompes P, Mol BW, Kazemier BM. Should the individual preterm birth risk be incorporated into the embryo transfer policy in in vitro fertilisation? A decision analysis. BJOG : an international journal of obstetrics and gynaecology 2015;122: 825-833.	Relevant intervention is not included
25	Kawwass JF, Kulkarni AD, Hipp HS, Crawford S, Kissin DM, Jamieson DJ. Extremities of body mass index and their association with pregnancy outcomes in women undergoing in vitro fertilization in the United States. Fertility and sterility 2016;106: 1742-1750.	Relevant intervention is not included
26	Keegan DA, Krey LC, Chang HC, Noyes N. Increased risk of pregnancy-induced hypertension in young recipients of donated oocytes. Fertility and sterility 2007;87: 776-781.	Relevant intervention is not included
27	Kjellberg AT, Carlsson P, Bergh C. Randomized single versus double embryo transfer: obstetric and paediatric outcome and a cost-effectiveness analysis. Human reproduction (Oxford, England) 2006;21: 210-216.	Relevant intervention is not included
28	Klatsky PC, Delaney SS, Caughey AB, Tran ND, Schattman GL, Rosenwaks Z. The role of embryonic origin in preeclampsia: a comparison of autologous in vitro fertilization and ovum donor pregnancies. Obstetrics and gynecology 2010;116: 1387-1392.	Relevant intervention is not included
29	Kozinszky Z, Zádori J, Orvos H, Katona M, Pál A, Kovács L. Obstetric and neonatal risk of pregnancies after assisted reproductive technology: a matched control study. Acta obstetricia et gynecologica Scandinavica 2003;82: 850-856.	Relevant intervention is not included
30	Liu J, Linara E, Zhao W, Ma H, Ahuja K, Wang J. Neonatal and obstetric outcomes of in vitro fertilization (IVF) and natural conception at a Chinese reproductive unit. Clinical and experimental obstetrics & gynecology 2015;42: 452-456.	Relevant patients are not included, or only as subgroup
31	Liu J, Wu Y, Xu S, Su D, Han Y, Wu X. Retrospective evaluation of pregnancy outcomes and clinical implications of 34 Han Chinese women with unicornuate uterus who received IVF-ET or ICSI-ET treatment. Journal of obstetrics and gynaecology: the journal of the Institute of Obstetrics and Gynaecology 2017;37: 1020-1024.	Relevant intervention is not included
32	Liu SY, Teng B, Fu J, Li X, Zheng Y, Sun XX. Obstetric and neonatal outcomes after transfer of vitrified early cleavage embryos. Human reproduction (Oxford, England) 2013;28: 2093-2100.	Relevant patients are not included, or only as subgroup
33	Luke B. Pregnancy and birth outcomes in couples with infertility with and without assisted reproductive technology: with an emphasis on US population-based studies. American journal of obstetrics and gynecology 2017;217: 270-281.	Relevant patients are not included, or only as subgroup
34	Manzur A, Goldsman MP, Stone SC, Frederick JL, Balmaceda JP, Asch RH. Outcome of triplet pregnancies after assisted reproductive techniques: how frequent are the vanishing embryos? Fertility and sterility 1995;63: 252-257.	Relevant intervention is not included
35	Márton V, Zádori J, Kozinszky Z, Keresztúri A. Prevalences and pregnancy outcome of vanishing twin pregnancies achieved by in vitro fertilization versus natural conception. Fertility and sterility 2016;106: 1399-1406.	Relevant intervention is not included

36	Messerschmidt A, Olischar M, Birnbacher R, Weber M, Pollak A, Leitich H. Perinatal outcome of preterm infants <1500 g after IVF pregnancies compared with natural conception. Archives of disease in childhood Fetal and neonatal edition 2010;95: F225-229.	Relevant intervention is not included
37	Meyer R, Orvieto R, Israel A, Mohr-Sasson A, Timerman Y, Gorodesky T, Toussia-Cohen S, Hendler I, Simchen MJ, Machtinger R. Outcomes of singleton versus twin pregnancies in the fifth and sixth decades. European journal of obstetrics, gynecology, and reproductive biology 2018;231: 255-261.	Relevant patients are not included, or only as subgroup
38	Michaluk A, Dionne MD, Gazdovich S, Buch D, Ducruet T, Leduc L. Predicting preterm birth in twin pregnancy: was the previous birth preterm? A Canadian experience. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2013;35: 793-801.	Relevant intervention is not included
39	Mor N, Machtinger R, Yinon Y, Toussia-Cohen S, Amitai Komem D, Levin M, Sivan E, Meyer R. Outcome of two sequential singleton pregnancies and twin pregnancies among primiparous women at advanced age undergoing IVF. Archives of gynecology and obstetrics 2020;302: 1113-1119.	
40	Ogueh O, Brookes C, Johnson MR. A longitudinal study of the maternal cardiovascular adaptation to spontaneous and assisted conception pregnancies. Hypertension in pregnancy 2009;28: 273-289.	Relevant intervention is not included
41	Okun N, Sierra S. Pregnancy outcomes after assisted human reproduction. Journal of obstetrics and gynaecology Canada: JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2014;36: 64-83.	Relevant patients are not included, or only as subgroup
42	Olivennes F, Fanchin R, Lédée N, Righini C, Kadoch IJ, Frydman R. Perinatal outcome and developmental studies on children born after IVF. Human reproduction update 2002;8: 117-128.	Relevant patients are not included, or only as subgroup
43	Ombelet W, Cadron I, Gerris J, De Sutter P, Bosmans E, Martens G, Ruyssinck G, Defoort P, Molenberghs G, Gyselaers W. Obstetric and perinatal outcome of 1655 ICSI and 3974 IVF singleton and 1102 ICSI and 2901 IVF twin births: a comparative analysis. Reproductive biomedicine online 2005;11: 76-85.	Relevant intervention is not included
44	Ombelet W, Martens G, De Sutter P, Gerris J, Bosmans E, Ruyssinck G, Defoort P, Molenberghs G, Gyselaers W. Perinatal outcome of 12,021 singleton and 3108 twin births after non-IVF-assisted reproduction: a cohort study. Human reproduction (Oxford, England) 2006;21: 1025-1032.	Relevant patients are not included, or only as subgroup
45	Opdahl S, Henningsen AA, Tiitinen A, Bergh C, Pinborg A, Romundstad PR, Wennerholm UB, Gissler M, Skjærven R, Romundstad LB. Risk of hypertensive disorders in pregnancies following assisted reproductive technology: a cohort study from the CoNARTaS group. Human reproduction (Oxford, England) 2015;30: 1724-1731.	Relevant patients are not included, or only as subgroup
46	Papiernik E, Grangé G, Zeitlin J. Should multifetal pregnancy reduction be used for prevention of preterm deliveries in triplet or higher order multiple pregnancies? Journal of perinatal medicine 1998;26: 365-370.	Relevant intervention is not included
47	Parkinson J, Tran C, Tan T, Nelson J, Batzofin J, Serafini P. Perinatal outcome after in-vitro fertilization-surrogacy. Human reproduction (Oxford, England) 1999;14: 671-676.	Relevant intervention is not included
48	Petersen K, Hornnes PJ, Ellingsen S, Jensen F, Brocks V, Starup J, Jacobsen JR, Andersen AN. Perinatal outcome after in vitro fertilisation. Acta obstetricia et gynecologica Scandinavica 1995;74: 129-131.	Relevant intervention is not included
49	Pinborg A, Ortoft G, Loft A, Rasmussen SC, Ingerslev HJ. Cervical conization doubles the risk of preterm and very preterm birth in assisted reproductive technology twin pregnancies. Human reproduction (Oxford, England) 2015;30: 197-204.	relevant intervention is not included
50	Pregnancies and births resulting from in vitro fertilization: French national registry, analysis of data 1986 to 1990. FIVNAT (French In Vitro National). Fertility and sterility 1995;64: 746-756.	Relevant patients are not included, or only as subgroup
51	Sauer MV, Paulson RJ, Lobo RA. Oocyte donation to women of advanced reproductive age: pregnancy results and obstetrical outcomes in patients 45 years and older. Human reproduction (Oxford, England) 1996;11: 2540-2543.	Relevant intervention is not included
52	Sauer MV, Paulson RJ, Lobo RA. Pregnancy in women 50 or more years of age: outcomes of 22 consecutively established pregnancies from oocyte donation. Fertility and sterility 1995;64: 111-115.	Relevant intervention is not included
53	Sazonova A, Källen K, Thurin-Kjellberg A, Wennerholm UB, Bergh C. Neonatal and maternal outcomes comparing women undergoing two in vitro fertilization (IVF) singleton pregnancies and women undergoing one IVF twin pregnancy. Fertility and sterility 2013;99: 731-737.	Relevant intervention is not included
54	Simchen MJ, Yinon Y, Moran O, Schiff E, Sivan E. Pregnancy outcome after age 50. Obstetrics and gynecology 2006;108: 1084-1088.	Relevant intervention is not included
55	Söderström-Anttila V, Salokorpi T, Pihlaja M, Serenius-Sirve S, Suikkari AM. Obstetric and perinatal outcome and preliminary results of development of children born after in vitro maturation of oocytes. Human reproduction (Oxford, England) 2006;21: 1508-1513.	Relevant intervention is not included
56	Söderström-Anttila V, Wennerholm UB, Loft A, Pinborg A, Aittomäki K, Romundstad LB, Bergh C. Surrogacy: outcomes for surrogate mothers, children and the resulting families-a systematic review. Human reproduction update 2016;22: 260-276.	Relevant patients are not included, or only as subgroup
57	Strom CM, Strom S, Levine E, Ginsberg N, Barton J, Verlinsky Y. Obstetric outcomes in 102 pregnancies after preimplantation genetic diagnosis. American journal of obstetrics and gynecology 2000;182: 1629-1632.	Relevant intervention is not included
58	Sullivan EA, Chapman MG, Wang YA, Adamson GD. Population-based study of cesarean section after in vitro fertilization in Australia. Birth (Berkeley, Calif) 2010;37: 184-191.	Relevant patients are not included, or only as subgroup
59	Suzuki S, Hiraizumi Y, Miyake H. Risk factors for postpartum hemorrhage requiring transfusion in cesarean deliveries for Japanese twins: comparison with those for singletons. Archives of gynecology and obstetrics 2012;286: 1363-1367.	Relevant patients are not included, or only as subgroup
60	Suzuki S, Igarashi M. Risk factors for preeclampsia in Japanese twin pregnancies: comparison with those in singleton pregnancies. Archives of gynecology and obstetrics 2009;280: 389-393.	Relevant outcomes are not assessed or inappropriately assessed
61	Tallo CP, Vohr B, Oh W, Rubin LP, Seifer DB, Haning RV, Jr. Maternal and neonatal morbidity associated with in vitro fertilization. The Journal of pediatrics 1995;127: 794-800.	Relevant intervention is not included

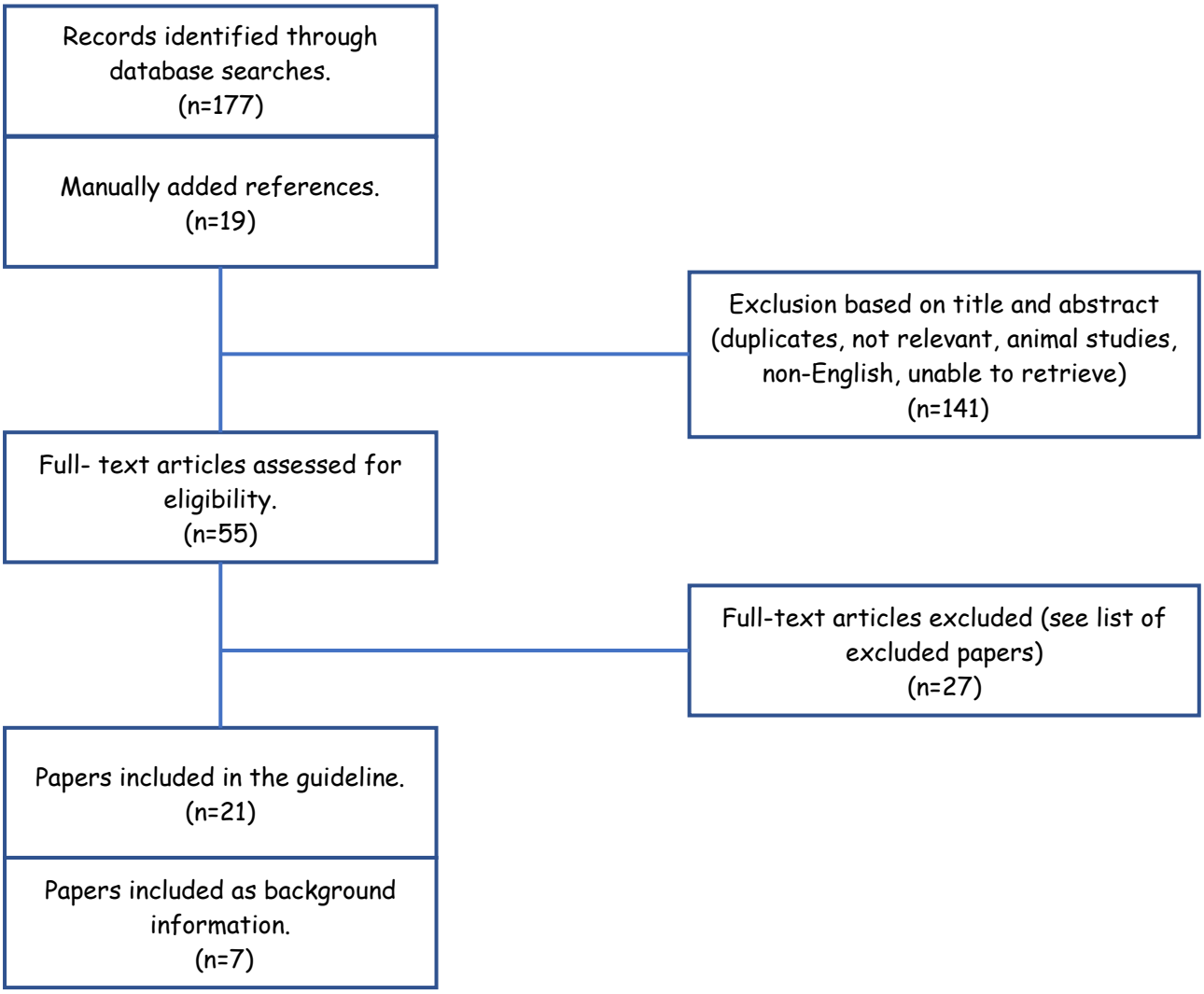
62	Tan JK, Tan EL, Kanagalingam D, Yu SL, Tan LK. Multiple pregnancy is the leading contributor to cesarean sections in in vitro fertilization pregnancies: An analysis using the Robson 10-group classification system. The journal of obstetrics and gynaecology research 2016;42: 1141-1145.	Relevant intervention is not included
63	Tan SL, Doyle P, Campbell S, Beral V, Rizk B, Brinsden P, Mason B, Edwards RG. Obstetric outcome of in vitro fertilization pregnancies compared with normally conceived pregnancies. American journal of obstetrics and gynecology 1992;167: 778-784.	Relevant intervention is not included
64	van Dorp W, Rietveld AM, Laven JS, van den Heuvel-Eibrink MM, Hukkelhoven CW, Schipper I. Pregnancy outcome of non-anonymous oocyte donation: a case-control study. European journal of obstetrics, gynecology, and reproductive biology 2014;182: 107-112.	Relevant intervention is not included
65	Vieira LA, Warren L, Pan S, Ferrara L, Stone JL. Comparing pregnancy outcomes and loss rates in elective twin pregnancy reduction with ongoing twin gestations in a large contemporary cohort. American journal of obstetrics and gynecology 2019;221: 253.e251-253.e258.	Relevant patients are not included, or only as subgroup
66	Wang YQ, Yin TL, Xu WM, Qi QR, Wang XC, Yang J. Reproductive outcomes in women with prior cesarean section undergoing in vitro fertilization: A retrospective case-control study. Journal of Huazhong University of Science and Technology Medical sciences = Hua zhong ke ji da xue xue bao Yi xue Ying De wen ban = Huazhong keji daxue xuebao Yixue Yingdewen ban 2017;37: 922-927.	Relevant patients are not included, or only as subgroup
67	Wennerholm UB, Bergh C, Hamberger L, Nilsson L, Reismer E, Wennergren M, Wikland M. Obstetric and perinatal outcome of pregnancies following intracytoplasmic sperm injection. Human reproduction (Oxford, England) 1996;11: 1113-1119.	Relevant outcomes are not assessed or inappropriately assessed
68	Wennerholm UB, Bergh C, Hamberger L, Westlander G, Wikland M, Wood M. Obstetric outcome of pregnancies following ICSI, classified according to sperm origin and quality. Human reproduction (Oxford, England) 2000;15: 1189-1194.	Relevant intervention is not included
69	Westergaard HB, Johansen AM, Erb K, Andersen AN. Danish National IVF Registry 1994 and 1995. Treatment, pregnancy outcome and complications during pregnancy. Acta obstetricia et gynecologica Scandinavica 2000;79: 384-389.	Relevant intervention is not included
70	Wimalasundera RC, Trew G, Fisk NM. Reducing the incidence of twins and triplets. Best practice & research Clinical obstetrics & gynaecology 2003;17: 309-329.	Relevant outcomes are not assessed or inappropriately assessed
71	Wisanto A, Magnus M, Bonduelle M, Liu J, Camus M, Tournaye H, Liebaers I, Van Steirteghem AC, Devroey P. Obstetric outcome of 424 pregnancies after intracytoplasmic sperm injection. Human reproduction (Oxford, England) 1995;10: 2713-2718.	Relevant intervention is not included
72	Wiser A, Levron J, Kreizer D, Achiron R, Shrim A, Schiff E, Dor J, Shulman A. Outcome of pregnancies complicated by severe ovarian hyperstimulation syndrome (OHSS): a follow-up beyond the second trimester. Human reproduction (Oxford, England) 2005;20: 910-914.	Relevant intervention is not included
73	Zhang N, Chen H, Xu Z, Wang B, Sun H, Hu Y. Pregnancy, Delivery, and Neonatal Outcomes of In Vitro Fertilization-Embryo Transfer in Patient with Previous Cesarean Scar. Medical science monitor : international medical journal of experimental and clinical research 2016;22: 3288-3295.	Relevant intervention is not included

PICO 2. Which financial issues should be considered for couples/individuals planning a singleton or multiple pregnancy/birth?

Search strings

PUBMED	("Pregnancy, Multiple "[Mesh] OR "Multiple Birth Offspring"[Mesh] OR “multiple birth” OR “high-order multiple” OR “high-order gestation”) AND (Singleton* OR “single birth”) AND ("Health Expenditures" [Mesh] OR "Health Care Costs"[Mesh] OR Expense* OR expenditure* OR spending OR “Out-of-Pocket Payment” OR “financial” OR cost*)
COCHRANE	("multiple pregnancy” OR "Multiple Birth Offspring" OR “multiple birth” OR “high-order multiple” OR “high-order gestation”) AND (Singleton OR “single birth”) AND ("Health Expenditures" OR Expense OR expenditure OR spending OR “Out-of-Pocket Payment” OR “financial” OR cost)

Flowchart



List of excluded studies

Nr	reference	Exclusion criteria
1	Chambers GM, Ledger W. The economic implications of multiple pregnancy following ART. Seminars in fetal & neonatal medicine 2014;19: 254-261.	IVF and spontaneous children
2	Crawford S, Boulet SL, Mneimneh AS, Perkins KM, Jamieson DJ, Zhang Y, Kissin DM. Costs of achieving live birth from assisted reproductive technology: a comparison of sequential single and double embryo transfer approaches. Fertility and sterility 2016;105: 444-450.	Projections for eSET data
3	De Sutter P, Gerris J, Dhont M. A health-economic decision-analytic model comparing double with single embryo transfer in IVF/ICSI. Human reproduction (Oxford, England) 2002;17: 2891-2896.	Uses estimates
4	Dixon S, Faghih Nasiri F, Ledger WL, Lenton EA, Duenas A, Sutcliffe P, Chilcott JB. Cost-effectiveness analysis of different embryo transfer strategies in England. BJOG : an international journal of obstetrics and gynaecology 2008;115: 758-766.	Modelled
5	Ellison MA, Hall JE. Social stigma and compounded losses: quality-of-life issues for multiple-birth families. Fertility and sterility 2003;80: 405-414.	No financial issues
6	Evans MI, Hume RF, Jr., Polak S, Yaron Y, Drugan A, Diamond MP, Johnson MP. The geriatric gravida: multifetal pregnancy reduction, donor eggs, and aggressive infertility treatments. American journal of obstetrics and gynecology 1997;177: 875-878.	No financial issues
7	Fiddelers AA, Dirksen CD, Dumoulin JC, van Montfoort AP, Land JA, Janssen JM, Evers JL, Severens JL. Cost-effectiveness of seven IVF strategies: results of a Markov decision-analytic model. Human reproduction (Oxford, England) 2009;24: 1648-1655.	Modelled
8	Fugel HJ, Connolly M, Nuijten M. An economic assessment of embryo diagnostics (Dx) - the costs of introducing non-invasive embryo diagnostics into IVF standard treatment practices. BMC health services research 2014;14: 482.	No singleton vs twin evaluation
9	Gerris J. Single-embryo transfer versus multiple-embryo transfer. Reproductive biomedicine online 2009;18 Suppl 2: 63-70.	Prospective, not a full cost-effectiveness analysis

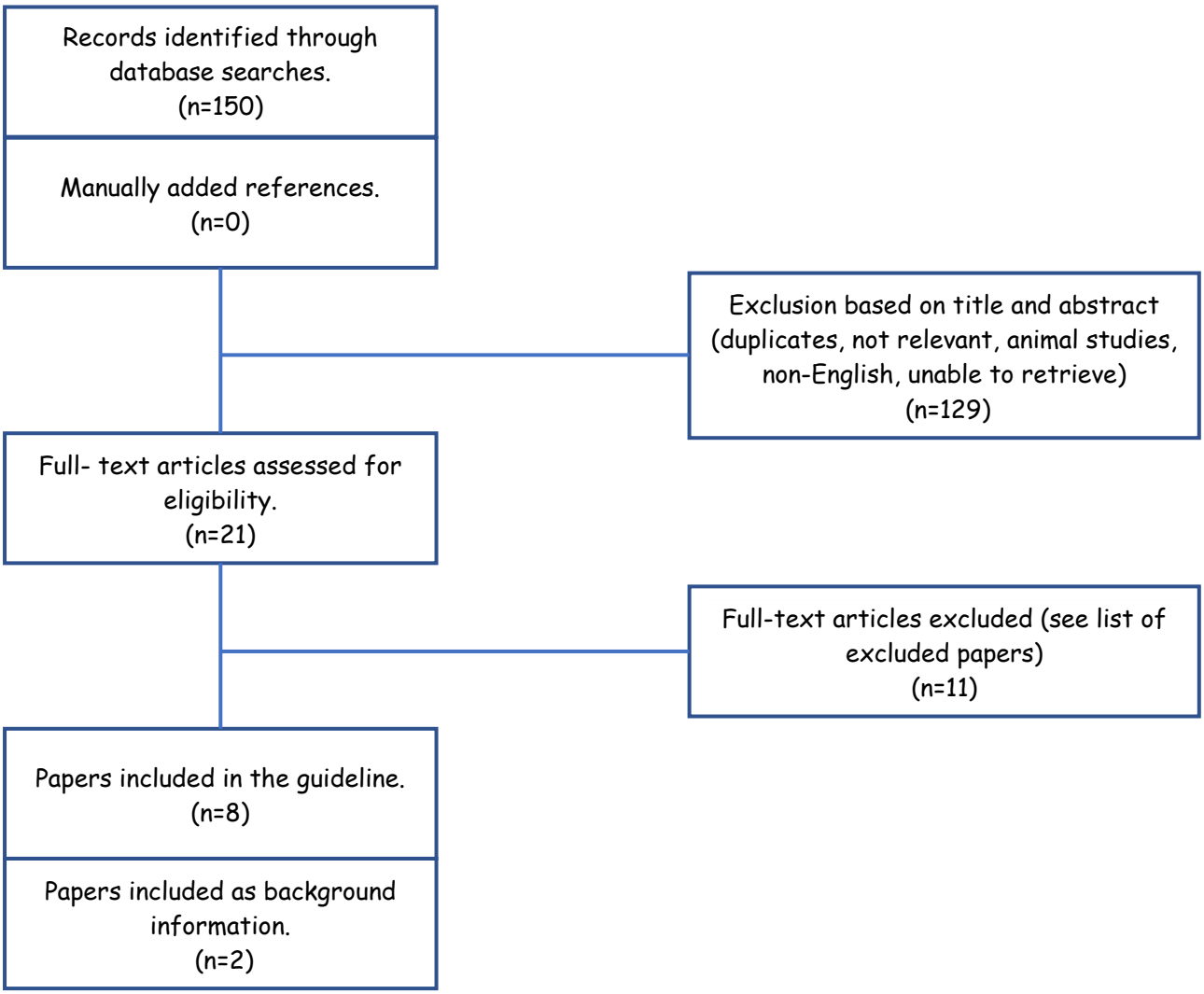
10	Gleicher N, Barad D. Twin pregnancy, contrary to consensus, is a desirable outcome in infertility. Fertility and sterility 2009;91: 2426-2431.	Literature review
11	Henderson J, Hockley C, Petrou S, Goldacre M, Davidson L. Economic implications of multiple births: inpatient hospital costs in the first 5 years of life. Archives of disease in childhood Fetal and neonatal edition 2004;89: F542-545.	Retrospective, no IVF data, per child data
12	Kansal-Kalra S, Milad MP, Grobman WA. In vitro fertilization (IVF) versus gonadotropins followed by IVF as treatment for primary infertility: a cost-based decision analysis. Fertility and sterility 2005;84: 600-604.	No singleton vs twin evaluation
13	Kinzler WL, Ananth CV, Vintzileos AM. Medical and economic effects of twin gestations. Journal of the Society for Gynecologic Investigation 2000;7: 321-327.	Full text not available
14	Koivurova S, Hartikainen AL, Gissler M, Hemminki E, Järvelin MR. Post-neonatal hospitalization and health care costs among IVF children: a 7-year follow-up study. Human reproduction (Oxford, England) 2007;22: 2136-2141.	Matched to spontaneous data
15	Lukassen HG, Schönbeck Y, Adang EM, Braat DD, Zielhuis GA, Kremer JA. Cost analysis of singleton versus twin pregnancies after in vitro fertilization. Fertility and sterility 2004;81: 1240-1246.	Small
16	Luke B, Bigger HR, Leurgans S, Sietsema D. The cost of prematurity: a case-control study of twins vs singletons. American journal of public health 1996;86: 809-814.	No IVF data
17	Mistry H, Dowie R, Young TA, Gardiner HM. Costs of NHS maternity care for women with multiple pregnancy compared with high-risk and low-risk singleton pregnancy. BJOG : an international journal of obstetrics and gynaecology 2007;114: 1104-1112.	No IVF data
18	Peeraer K, D'Hooghe TM, Vandoren C, Trybou J, Spiessens C, Debrock S, De Neubourg D. A 50% reduction in multiple live birth rate is associated with a 13% cost saving: a real-life retrospective cost analysis. Reproductive biomedicine online 2017;35: 279-286.	Good cost evaluation
19	Scotland GS, McLernon D, Kurinczuk JJ, McNamee P, Harrild K, Lyall H, Rajkhowa M, Hamilton M, Bhattacharya S. Minimising twins in in vitro fertilisation: a modelling study assessing the costs, consequences and cost-utility of elective single versus double embryo transfer over a 20-year time horizon. BJOG : an international journal of obstetrics and gynaecology 2011;118: 1073-1083.	Modelled
20	Sitler C, Lustik M, Levy G, Pier B. Single Embryo Transfer Versus Double Embryo Transfer: A Cost-Effectiveness Analysis in a Non-IVF Insurance Mandated System. Military medicine 2020;185: e1700-e1705.	Modelled
21	van Baaren GJ, Peelen MJ, Schuit E, van der Post JA, Mol BW, Kok M, Hajenius PJ. Preterm birth in singleton and multiple pregnancies: evaluation of costs and perinatal outcomes. European journal of obstetrics, gynecology, and reproductive biology 2015;186: 34-41.	women with preterm birth only
22	van Heesch MM, Bonsel GJ, Dumoulin JC, Evers JL, van der Hoeven MA, Severens JL, Dykgraaf RH, van der Veen F, Tonch N, Nelen WL et al. Long term costs and effects of reducing the number of twin pregnancies in IVF by single embryo transfer: the TwinSing study. BMC pediatrics 2010;10: 75.	Modelled, unrealistic scenario
23	van Heesch MM, van Asselt AD, Evers JL, van der Hoeven MA, Dumoulin JC, van Beijsterveldt CE, Bonsel GJ, Dykgraaf RH, van Goudoever JB, Koopman-Esseboom C et al. Cost-effectiveness of embryo transfer strategies: a decision analytic model using long-term costs and consequences of singletons and multiples born as a consequence of IVF. Human reproduction (Oxford, England) 2016;31: 2527-2540.	Study design only, no results
24	van Loendersloot LL, Moolenaar LM, van Wely M, Repping S, Bossuyt PM, Hompes PGA, van der Veen F, Mol BWJ. Cost-effectiveness of single versus double embryo transfer in IVF in relation to female age. European journal of obstetrics, gynecology, and reproductive biology 2017;214: 25-30.	Modelled
25	van Peperstraten A, Nelen W, Grol R, Zielhuis G, Adang E, Stalmeier P, Hermens R, Kremer J. The effect of a multifaceted empowerment strategy on decision making about the number of embryos transferred in in vitro fertilisation: randomised controlled trial. BMJ (Clinical research ed) 2010;341: c2501.	included in part B of the guideline
26	Veleva Z, Karinen P, Tomás C, Tapanainen JS, Martikainen H. Elective single embryo transfer with cryopreservation improves the outcome and diminishes the costs of IVF/ICSI. Human reproduction (Oxford, England) 2009;24: 1632-1639.	IVF costs only
27	Wølner-Hanssen P, Rydhstroem H. Cost-effectiveness analysis of in-vitro fertilization: estimated costs per successful pregnancy after transfer of one or two embryos. Human reproduction (Oxford, England) 1998;13: 88-94.	Modelled

PICO 3: Which psychosocial issues should be considered for couples/individuals having a singleton or multiple pregnancy/birth?

Search strings

PUBMED	("Mothers"[Mesh] AND("Pregnancy, Multiple/psychology"[Mesh] OR "Multiple Birth Offspring/psychology"[Mesh] OR “multiple birth” OR twin* OR triplet* OR quadruplet OR quintuplet OR sextuplets OR septuplets OR octuplets OR nonuplets OR “high-order multiple” OR “high-order gestation”)) AND (Singleton* OR “single birth”) AND ("Psychology"[Mesh] OR "Depression, Postpartum"[Mesh] OR "Stress, Psychological"[Mesh] OR “psychological distress” OR stress OR depression OR divorce OR relation)
COCHRANE	("Mothers"[Mesh] AND("Pregnancy, Multiple/psychology"[Mesh] OR "Multiple Birth Offspring/psychology"[Mesh] OR “multiple birth” OR twin* OR triplet* OR quadruplet OR quintuplet OR sextuplets OR septuplets OR octuplets OR nonuplets OR “high-order multiple” OR “high-order gestation”)) AND (Singleton* OR “single birth”) AND ("Psychology"[Mesh] OR "Depression, Postpartum"[Mesh] OR "Stress, Psychological"[Mesh] OR “psychological distress” OR stress OR depression OR divorce OR relation)

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Bryan E. The impact of multiple preterm births on the family. *BJOG : an international journal of obstetrics and gynaecology* 2003;110 Suppl 20: 24-28.	No better data compared to newer studies
2	Vilska S, Unkila-Kallio L, Punamäki RL, Poikkeus P, Repokari L, Sinkkonen J, Tiitinen A, Tulppala M. Mental health of mothers and fathers of twins conceived via assisted reproduction treatment: a 1-year prospective study. *Human reproduction (Oxford, England)* 2009;24: 367-377.	These results are similar to those of the systematic review of Wenze et al. 2015
3	Thorpe K, Golding J, MacGillivray I, Greenwood R. Comparison of prevalence of depression in mothers of twins and mothers of singletons. *BMJ (Clinical research ed)* 1991;302: 875-878.	Old study
4	Taubman-Ben-Ari O, Findler L, Sharon N. Personal growth in mothers: examination of the suitability of the posttraumatic growth inventory as a measurement tool. *Women & health* 2011;51: 604-622.	small sample size
5	Taubman-Ben-Ari O, Findler L, Bendet C, Stanger V, Ben-Shlomo S, Kuint J. Mothers' marital adaptation following the birth of twins or singletons: empirical evidence and practical insights. *Health & social work* 2008;33: 189-197.	No relevant outcomes
6	Salami KK, Brieger WR, Olutayo L. Stress and coping among mothers of twins in rural southwestern Nigeria. *Twin research : the official journal of the International Society for Twin Studies* 2003;6: 55-61.	Similar results to newer studies
7	Ostfeld BM, Smith RH, Hiatt M, Hegyi T. Maternal behavior toward premature twins: implications for development. *Twin research : the official journal of the International Society for Twin Studies* 2000;3: 234-241.	small sample size
8	Gondwe KW, Yang Q, White-Traut R, Holditch-Davis D. Maternal Psychological Distress and Mother-Infant Relationship: Multiple-Birth Versus Singleton Preterm Infants. *Neonatal network : NN* 2017;36: 77-88.	Full text not found
9	Freeman T, Golombok S, Olivennes F, Ramogida C, Rust J. Psychological assessment of mothers and their assisted reproduction triplets at age 3 years. *Reproductive biomedicine online* 2007;15 Suppl 3: 13-17.	Same population as Golombok et al., 2007
10	Feldman R, Eidelman AI, Rotenberg N. Parenting stress, infant emotion regulation, maternal sensitivity, and the cognitive development of triplets: a model for parent and child influences in a unique ecology. *Child development* 2004;75: 1774-1791.	No relevant intervention

11	Bolch CE, Davis PG, Umstad MP, Fisher JR. Multiple birth families with children with special needs: a qualitative investigation of mothers' experiences. *Twin research and human genetics: the official journal of the International Society for Twin Studies* 2012;15: 503-515.	Small sample size

PICO 4. Which personal, regulatory and reimbursement factors are expected to affect the decision for number of embryos to transfer? (Narrative)

Search strings

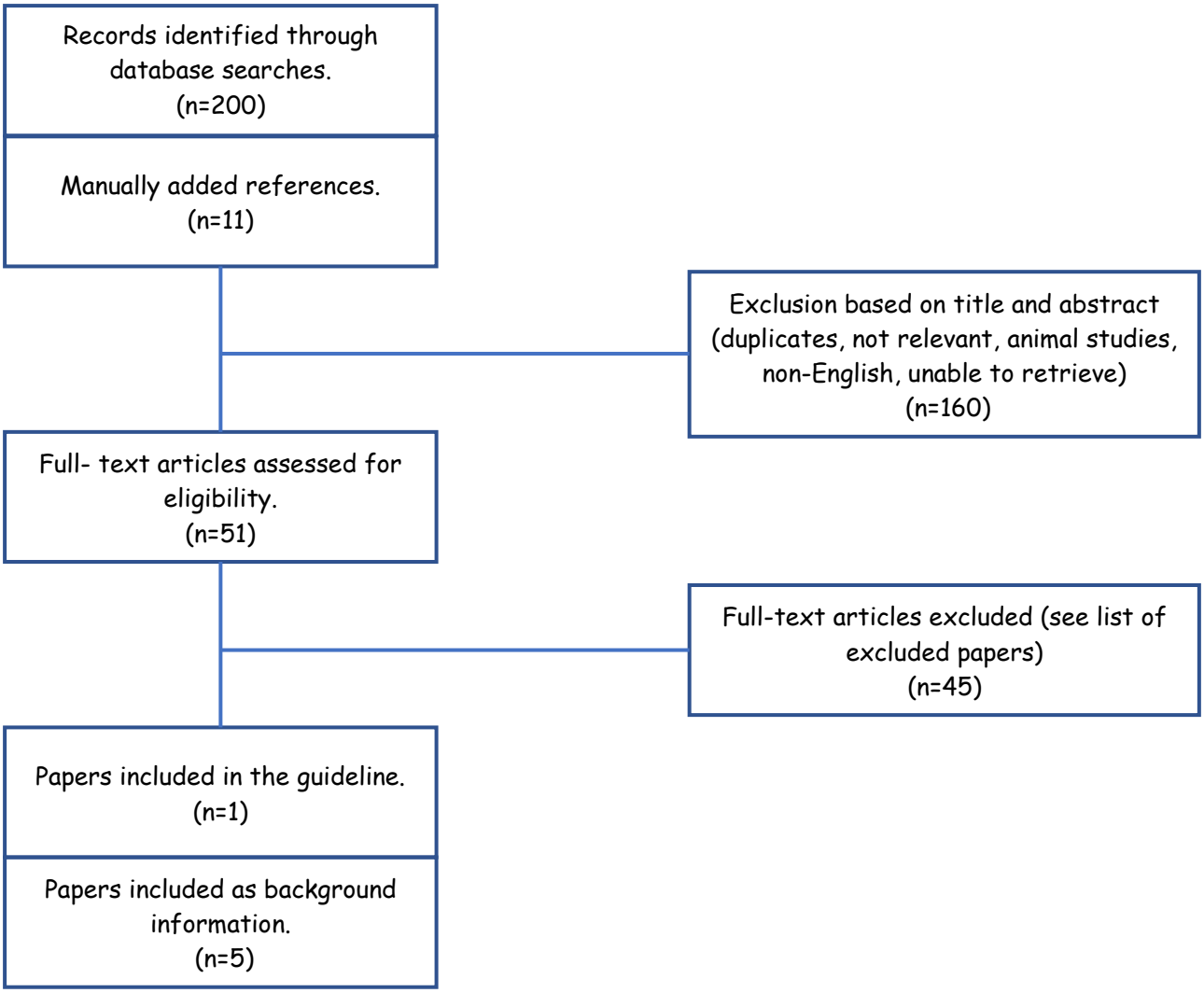
This question is a narrative question. The section was prepared based on expert opinion and selected papers from the literature searches. 34 papers were included in the narrative section.

PICO 5. Should the number of previous unsuccessful ART treatments be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART? If yes, what is the cut off?

Search strings

PUBMED	(“Failed fertility treatment” OR “failed in vitro fertilization cycle*” OR “failed in vitro fertilization treatment” OR “failed IVF treatment” OR “failed IVF cycle*” OR “previous failed IVF cycles” OR “unsuccessful IVF treatment”) AND ("Single Embryo Transfer" AND "Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy”)
PUBMED	(("Fertilization in vitro" [MeSH] AND "Sperm Injections, Intracytoplasmic"[Mesh] OR IVF OR ICSI OR "in vitro fertilization" OR "intracytoplasmic sperm insemination" OR "intracytoplasmic sperm injection” OR "fertilization in vitro" OR "in vitro fertilisation" OR "fertilization in vitro")AND (“Failed fertility treatment” OR “ failed in vitro fertilization cycle*” OR “ failed in vitro fertilization treatment” OR “failed IVF treatment” OR “ failed IVF cycle*” OR “previous failed IVF cycles” OR “unsuccessful IVF treatment”)) AND ("Single Embryo Transfer" AND "Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))
COCHRANE	(“Failed fertility treatment” OR “failed in vitro fertilization cycle” OR “failed in vitro fertilization treatment” OR “failed IVF treatment” OR “failed IVF cycle*” OR “previous failed IVF cycles” OR “unsuccessful IVF treatment”) AND ("Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy”)

Flowchart



List of excluded papers

Nr	Reference	Exclusion criteria
1	Pandian Z, Marjoribanks J, Ozturk O, Serour G, Bhattacharya S. Number of embryos for transfer following in vitro fertilisation or intra-cytoplasmic sperm injection. Cochrane Database of Systematic Reviews 2013.	No information about previous unsuccessful ART treatments
2	Twisk M, Mastenbroek S, van Wely M, Heineman MJ, Van der Veen F, Repping S. Preimplantation genetic screening for abnormal number of chromosomes (aneuploidies) in in vitro fertilisation or intracytoplasmic sperm injection. Cochrane Database of Systematic Reviews 2006.	paper about PGS, not about DET or SET
3	Moragianni VA, Penzias AS. Cumulative live-birth rates after assisted reproductive technology. Current opinion in obstetrics & gynecology 2010;22: 189-192.	review article about cumulative live-birth rates
4	Mitri F, Nayot D, Casper RF, Bentov Y. Current tools for the optimization of embryo transfer technique for recurrent implantation failure. Minerva ginecologica 2016;68: 431-449.	Deals with repeated implantation failure (RIF), not with DET or SET
5	Kamath MS, Kirubakaran R, Sunkara SK. Granulocyte-colony stimulating factor administration for subfertile women undergoing assisted reproduction. Cochrane Database of Systematic Reviews 2020.	Improving embryo transfer technique in RIF cases
6	Gerris JM. Single embryo transfer and IVF/ICSI outcome: a balanced appraisal. Human reproduction update 2005;11: 105-121.	no information about previous unsuccessful ART treatments
7	Costello MF, Garad RM, Hart R, Homer H, Johnson L, Jordan C, Mocanu E, Qiao J, Rombauts L, Teede HJ et al. A Review of Second- and Third-line Infertility Treatments and Supporting Evidence in Women with Polycystic Ovary Syndrome. Medical sciences (Basel, Switzerland) 2019;7.	no information about SET or DET
8	Blake DA, Farquhar CM, Johnson N, Proctor M. Cleavage stage versus blastocyst stage embryo transfer in assisted conception. The Cochrane database of systematic reviews 2007: CD002118-CD002118.	deals with blastocyst versus cleavage stage ET, not with SET or DET
9	Alecsandru D, Garcia-Velasco JA. Why natural killer cells are not enough: a further understanding of killer immunoglobulin-like receptor and human leukocyte antigen. Fertility and sterility 2017;107: 1273-1278.	deals with natural killer cells in the endometrium
10	Medical advisory secretariate; In vitro fertilization and multiple pregnancies: an evidence-based analysis. Ontario health technology assessment series 2006;6: 1-63.	Canadian policy on SET
11	Rubio C, Bellver J, Rodrigo L, Bosch E, Mercader A, Vidal C, De los Santos MJ, Giles J, Labarta E, Domingo J et al. Preimplantation genetic screening using fluorescence in situ hybridization in patients with repetitive implantation failure and advanced maternal age: two randomized trials. Fertility and sterility 2013;99: 1400-1407.	This RCT deals with PGS, not with SET
12	Martikainen H, Tiitinen A, Tomas C, Tapanainen J, Orava M, Tuomivaara L, Vilska S, Hyden-Granskog C, Hovatta O. One versus two embryo transfer after IVF and ICSI: a randomized study. Human reproduction (Oxford, England) 2001;16: 1900-1903.	No information about previous unsuccessful ART treatments
13	Goldman MB, Thornton KL, Ryley D, Alper MM, Fung JL, Hornstein MD, Reindollar RH. A randomized clinical trial to determine optimal infertility treatment in older couples: the Forty and Over Treatment Trial (FORT-T). Fertility and sterility 2014;101: 1574-1581.e1571-1572.	No information about previous unsuccessful ART treatments
14	Fauque P, Jouannet P, Davy C, Guibert J, Viallon V, Epelboin S, Kunstmann J-M, Patrat C. Cumulative results including obstetrical and neonatal outcome of fresh and frozen-thawed cycles in elective single versus double fresh embryo transfers. Fertility and sterility 2010;94: 927-935.	No information about previous unsuccessful ART treatments
15	El-Toukhy T, Khalaf Y, Coomarasamy A, Tabanelli C, Gordts SS, Gordts S, Mestdagh G, Mardesic T, Marchino GL, Al-Shawaf T et al. A multicentre randomised study of pre-IVF outpatient hysteroscopy in women with recurrent IVF-et failure-the trophy trial. Human reproduction (Oxford, England) 2014;29: i36-i37.	deals with another topic: hysteroscopy or not
16	El-Toukhy T, Campo R, Khalaf Y, Tabanelli C, Gianaroli L, Gordts SS, Gordts S, Mestdagh G, Mardesic T, Voboril J et al. Hysteroscopy in recurrent in-vitro fertilisation failure (TROPHY): a multicentre, randomised controlled trial. Lancet (London, England) 2016;387: 2614-2621.	deals with another topic: hysteroscopy or not
17	Virro MR, Winger EE, Reed JL. Intravenous immunoglobulin for repeated IVF failure and unexplained infertility. American journal of reproductive immunology (New York, NY : 1989) 2012;68: 218-225.	deals with immunoglobulins in RIF
18	van Montfoort APA, Dumoulin JCM, Land JA, Coonen E, Derhaag JG, Evers JLH. Elective single embryo transfer (eSET) policy in the first three IVF/ICSI treatment cycles. Human reproduction (Oxford, England) 2005;20: 433-436.	only first treatment cycle IVF cases were included
19	Ziebe S, Andersen AN, Andersen AG, Mikkelsen AL, Lindenberg S. Results of intracytoplasmic sperm injection in relation to indication. Acta obstetricia et gynecologica Scandinavica 1997;76: 335-339.	not related to study question
20	Wilkinson J, Roberts SA, Vail A. Developments in IVF warrant the adoption of new performance indicators for ART clinics, but do not justify the abandonment of patient-centred measures. Human reproduction (Oxford, England) 2017;32: 1155-1159.	not related to study question
21	Wang YA, Costello M, Chapman M, Black D, Sullivan EA. Transfers of fresh blastocysts and blastocysts cultured from thawed cleavage embryos are associated with fewer miscarriages. Reproductive biomedicine online 2011;23: 777-788.	not related to study question
22	Walsh AP, Shkrobot LV, Coull GD, Peirce KL, Walsh DJ, Salma U, Sills ES. Blastocyst transfer for multiple prior IVF failure: a five year descriptive study. Irish medical journal 2009;102: 282-285.	this paper deals with blastocyst transfer in poor prognosis patients, not with SET or DET

23	Volodarsky-Perel A, Eldar-Geva T, Holzer HE, Schonberger O, Reichman O, Gal M. Cryopreserved embryo transfer: adjacent or non-adjacent to failed fresh long GnRH-agonist protocol IVF cycle. Reproductive biomedicine online 2017;34: 267-273.	deals with a waiting time after a fresh cycle until a thawing cycle can be initiated
24	van Loendersloot LL, van Wely M, Repping S, Bossuyt PMM, van der Veen F. Individualized decision-making in IVF: calculating the chances of pregnancy. Human reproduction (Oxford, England) 2013;28: 2972-2980.	not related to study question
25	Twisk M, van der Veen F, Repping S, Heineman MJ, Korevaar JC, Bossuyt PM. Preferences of subfertile women regarding elective single embryo transfer: additional in vitro fertilization cycles are acceptable, lower pregnancy rates are not. Fertility and sterility 2007;88: 1006-1009.	not related to study question
26	Templeton A, Morris JK. Reducing the risk of multiple births by transfer of two embryos after in vitro fertilization. The New England journal of medicine 1998;339: 573-577.	mentions previous unsuccessful treatments with DET but no mention of SET
27	Smith A, Tilling K, Nelson SM, Lawlor DA. Live-Birth Rate Associated with Repeat In Vitro Fertilization Treatment Cycles. Jama 2015;314: 2654-2662.	no related to study question
28	Smith A, Tilling K, Lawlor DA, Nelson SM. Live birth rates and perinatal outcomes when all embryos are frozen compared with conventional fresh and frozen embryo transfer: a cohort study of 337,148 in vitro fertilisation cycles. BMC medicine 2019;17: 202.	not related to study question
29	Shapiro BS, Daneshmand ST, Garner FC, Aguirre M, Hudson C. Freeze-all can be a superior therapy to another fresh cycle in patients with prior fresh blastocyst implantation failure. Reproductive biomedicine online 2014;29: 286-290.	not related to study question
30	Ruiz-Alonso M, Galindo N, Pellicer A, Simón C. What a difference two days make: "personalized" embryo transfer (pET) paradigm: a case report and pilot study. Human reproduction (Oxford, England) 2014;29: 1244-1247.	no related to study question
31	Porcu G, Lehert P, Colella C, Giorgetti C. Predicting live birth chances for women with multiple consecutive failing IVF cycles: a simple and accurate prediction for routine medical practice. Reproductive biology and endocrinology: RB&E 2013;11: 1.	SET is not mentioned
32	Ozgur K, Bulut H, Berkkanoglu M, Donmez L, Coetzee K. Prediction of live birth and cumulative live birth rates in freeze-all-IVF treatment of a general population. Journal of assisted reproduction and genetics 2019;36: 685-696.	not related to study question
33	Molloy D, Doody ML, Breen T. Second time around: a study of patients seeking second assisted reproduction pregnancies. Fertility and sterility 1995;64: 546-551.	not related to study question
34	McLernon DJ, Maheshwari A, Lee AJ, Bhattacharya S. Cumulative live birth rates after one or more complete cycles of IVF: a population-based study of linked cycle data from 178,898 women. Human reproduction (Oxford, England) 2016;31: 572-581.	not related to study question
35	Luke B, Brown MB, Wantman E, Stern JE, Baker VL, Widra E, Coddington CC, 3rd, Gibbons WE, Van Voorhis BJ, Ball GD. Application of a validated prediction model for in vitro fertilization: comparison of live birth rates and multiple birth rates with 1 embryo transferred over 2 cycles vs 2 embryos in 1 cycle. American journal of obstetrics and gynecology 2015;212: 676.e671-677.	previous attempts not mentioned
36	Kupka MS, Dorn C, Montag M, Felberbaum RE, van der Ven H, Kulczycki A, Friese K. Previous miscarriages influence IVF and intracytoplasmatic sperm injection pregnancy outcome. Reproductive biomedicine online 2004;8: 349-357.	SET or DET not mentioned
37	Kresowik JD, Stegmann BJ, Sparks AE, Ryan GL, van Voorhis BJ. Five-years of a mandatory single-embryo transfer (mSET) policy dramatically reduces twinning rate without lowering pregnancy rates. Fertility and sterility 2011;96: 1367-1369.	No DET, mandatory SET, only oocyte donor cycles
38	Kahyaoglu I, Demir B, Turkkani A, Cinar O, Dilbaz S, Dilbaz B, Mollamahmutoglu L. Total fertilization failure: is it the end of the story? Journal of assisted reproduction and genetics 2014;31: 1155-1160.	not related to study question
39	Jungheim ES, Ryan GL, Levens ED, Cunningham AF, Macones GA, Carson KR, Beltsos AN, Odem RR. Embryo transfer practices in the United States: a survey of clinics registered with the Society for Assisted Reproductive Technology. Fertility and sterility 2010;94: 1432-1436.	previous attempts not mentioned
40	Hatirnaz S, Hatirnaz E, Dahan MH, Tan SL, Ozer A, Kanat-Pektas M, Ata B. Is elective single-embryo transfer a viable treatment policy in in vitro maturation cycles? Fertility and sterility 2016;106: 1691-1695.	SET in in vitro maturation cycles
41	Engmann L, Maconochie N, Tan SL, Bekir J. Trends in the incidence of births and multiple births and the factors that determine the probability of multiple birth after IVF treatment. Human reproduction (Oxford, England) 2001;16: 2598-2605.	number of unsuccessful previous attempts mentioned, but not related to SET or DET
42	De Sutter P, Delbaere I, Gerris J, Verstraelen H, Goetgeluk S, Van der Elst J, Temmerman M, Dhont M. Birthweight of singletons after assisted reproduction is higher after single- than after double-embryo transfer. Human reproduction (Oxford, England) 2006;21: 2633-2637.	SET versus DET, but number of previous failed treatment trials not mentioned.
43	Chambers GM, Paul RC, Harris K, Fitzgerald O, Boothroyd CV, Rombauts L, Chapman MG, Jorm L. Assisted reproductive technology in Australia and New Zealand: cumulative live birth rates as measures of success. The Medical journal of Australia 2017;207: 114-118.	not related to study question
44	Bodri D, Kawachiya S, De Brucker M, Tournaye H, Kondo M, Kato R, Matsumoto T. Cumulative success rates following mild IVF in unselected infertile patients: a 3-year, single-centre cohort study. Reproductive biomedicine online 2014;28: 572-581.	not related to study question

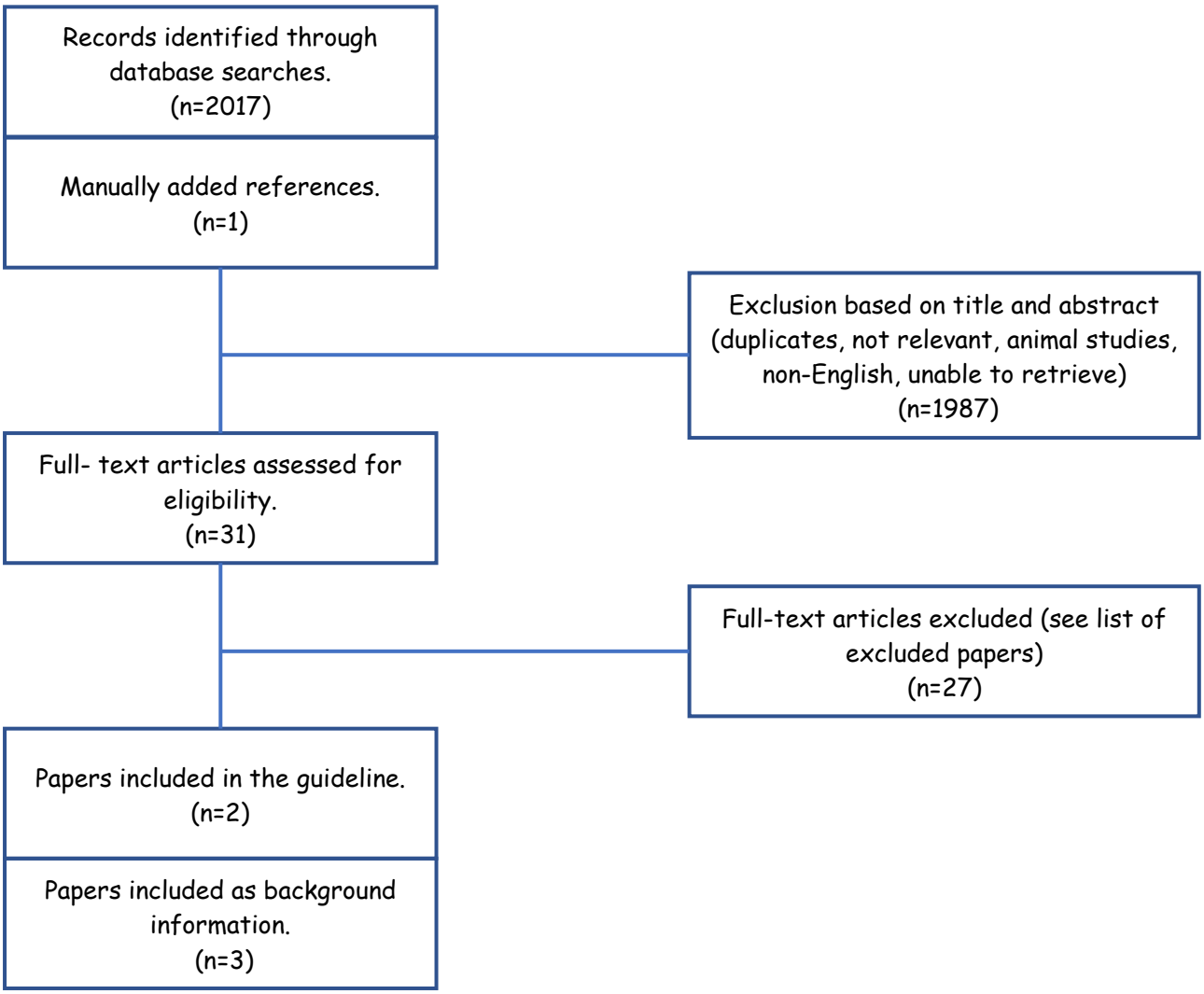
45	Alecsandru D, Garrido N, Vicario JL, Barrio A, Aparicio P, Requena A, Garcia-Velasco JA. Maternal KIR haplotype influences live birth rate after double embryo transfer in IVF cycles in patients with recurrent miscarriages and implantation failure. Human reproduction (Oxford, England) 2014;29: 2637-2643.	DET, related to natural killer cells

PICO 6. Should the duration of infertility be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART? If yes, what is the cut off?

Search strings

PUBMED	*("Infertility"[Mesh] AND "Infertility, Female"[Mesh] AND "Time-to-Pregnancy"[Mesh] OR "duration of infertility" OR " infertility duration" OR " period of infertility" OR " time to conception" OR " time to conceive" OR* Sterility OR Subfertility OR Sub-Fertility OR " time to get pregnant") AND ("Single Embryo Transfer" AND "Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy") AND (("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	("Infertility" OR "Time-to-Pregnancy" OR "duration of infertility" OR " infertility duration" OR " period of infertility" OR " time to conception" OR " time to conceive" OR Sterility OR Subfertility OR Sub-Fertility OR " time to get pregnant") AND (" Embryo transfer" OR SET OR DET) AND (("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))

Flowchart



List of excluded studies

	Reference	Exclusion criteria
1	Barri PN, Coroleu B, Clua E, Tur R. Prevention of prematurity by single embryo transfer. Journal of perinatal medicine 2011;39: 237-240.	duration of infertility not mentioned
2	Bensdorp AJ, Tjon-Kon-Fat RI, Bossuyt PMM, Koks CAM, Oosterhuis GJE, Hoek A, Hompes PGA, Broekmans FJM, Verhoeve HR, de Bruin JP et al. Prevention of multiple pregnancies in couples with unexplained or mild male subfertility: randomised controlled trial of in vitro fertilisation with single embryo transfer or in vitro fertilisation in modified natural cycle compared with intrauterine insemination with controlled ovarian hyperstimulation. BMJ (Clinical research ed) 2015;350: g7771-g7771.	unrelated to the study question
3	Bhattacharya S, Maheshwari A, Mollison J. Factors associated with failed treatment: an analysis of 121,744 women embarking on their first IVF cycles. PloS one 2013;8: e82249.	unrelated to the study question, which is SET versus DET, Duration of infertility was mentioned!
4	Collins JA, Van Steirteghem A. Overall prognosis with current treatment of infertility. Human reproduction update 2004;10: 309-316.	duration of infertility not mentioned
5	De Neubourg D, Gerris J, Van Royen E, Mangelschots K, Vercruyssen M. Impact of a restriction in the number of embryos transferred on the multiple pregnancy rate. European journal of obstetrics, gynecology, and reproductive biology 2006;124: 212-215.	duration of infertility not mentioned
6	Elzeiny H, Garrett C, Toledo M, Stern K, McBain J, Baker HWG. A randomised controlled trial of intra-uterine insemination versus in vitro fertilisation in patients with idiopathic or mild male infertility. The Australian & New Zealand journal of obstetrics & gynaecology 2014;54: 156-161.	unrelated to the study question
7	Harrild K, Bergh C, Davies M, De Neubourg D, Dumoulin JCM, Gerris J, Kremer JAM, Martikainen H, Mol BW, Norman RJ et al. Clinical effectiveness of elective single versus double embryo transfer: results from an individual patient data meta-analysis of randomised trials. Molecular human reproduction 2009;24: i77-.	duration of infertility not mentioned
8	Hatirnaz S, Hatirnaz E, Dahan MH, Tan SL, Ozer A, Kanat-Pektas M, Ata B. Is elective single-embryo transfer a viable treatment policy in in vitro maturation cycles? Fertility and sterility 2016;106: 1691-1695.	In vitro maturation only
9	Hatirnaz S, Pektas MK. Day 3 embryo transfer versus day 5 blastocyst transfers: a prospective randomized controlled trial. Turk jinekoloji ve obstetrik dernegi dergisi 2017;14: 82-88.	day 3 ET versus day 5 ET, Duration of infertility was mentioned!
10	He Y, Lu Y, Zhu Q, Wang Y, Lindheim SR, Qi J, Li X, Ding Y, Shi Y, Wei D et al. Influence of metabolic syndrome on female fertility and in vitro fertilization outcomes in PCOS women. American journal of obstetrics and gynecology 2019.	duration of infertility not mentioned
11	Huang Y, Li J, Zhang F, Liu Y, Xu G, Guo J, Zhang R, Wu Y, Liu J, Chen K et al. Factors affecting the live-birth rate in women with diminished ovarian reserve undergoing IVF-ET. Archives of gynecology and obstetrics 2018;298: 1017-1027.	Outcomes are not reported according to SET vs DET
12	Hull MG, Fleming CF, Hughes AO, McDermott A. The age-related decline in female fecundity: a quantitative controlled study of implanting capacity and survival of individual embryos after in vitro fertilization. Fertility and sterility 1996;65: 783-790.	unrelated to the study question,
13	Kamath MS, Bhattacharya S. Demographics of infertility and management of unexplained infertility. Best practice & research Clinical obstetrics & gynaecology 2012;26: 729-738.	unrelated to the study question,
14	Kamath MS, Bosteels J, D'Hooghe TM, Seshadri S, Weyers S, Mol BWJ, Broekmans FJ, Sunkara SK. Screening hysteroscopy in subfertile women and women undergoing assisted reproduction. Cochrane Database of Systematic Reviews 2019.	unrelated to the study question, deals with hysteroscopy
15	Lee AM, Connell MT, Csokmay JM, Styer AK. Elective single embryo transfer- the power of one. Contraception and reproductive medicine 2016;1: 11-11.	Duration of infertility not mentioned
16	Medical Advisory S. In vitro fertilization and multiple pregnancies: an evidence-based analysis. Ontario health technology assessment series 2006;6: 1-63.	Unrelated to the study question
17	Min JK, Hughes E, Young D, Joint Sogc-Cfas Clinical Practice Guidelines C, Reproductive E, Infertility C. Elective single embryo transfer following in vitro fertilization. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2010;32: 363-377.	Unrelated to the study question
18	Okun N, Sierra S, Genetics C, Special C. Pregnancy outcomes after assisted human reproduction. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2014;36: 64-83.	unrelated to the study question
19	Ozgur K, Bulut H, Berkkanoglu M, Donmez L, Coetzee K. Prediction of live birth and cumulative live birth rates in freeze-all-IVF treatment of a general population. Journal of assisted reproduction and genetics 2019;36: 685-696.	freeze all is the issue, not SET vs. DET, Duration of infertility was mentioned!
20	Pandian Z, Marjoribanks J, Ozturk O, Serour G, Bhattacharya S. Number of embryos for transfer following in vitro fertilisation or intra-cytoplasmic sperm injection. Cochrane Database of Systematic Reviews 2013.	duration of infertility not mentioned Cochrane database
21	Practice Committee of the American Society for Reproductive Medicine. Electronic address Aao, Practice Committee of the Society for Assisted Reproductive T. Guidance on the limits to the number of embryos to transfer: a committee opinion. Fertility and sterility 2017;107: 901-903.	Guideline paper, duration of infertility not mentioned

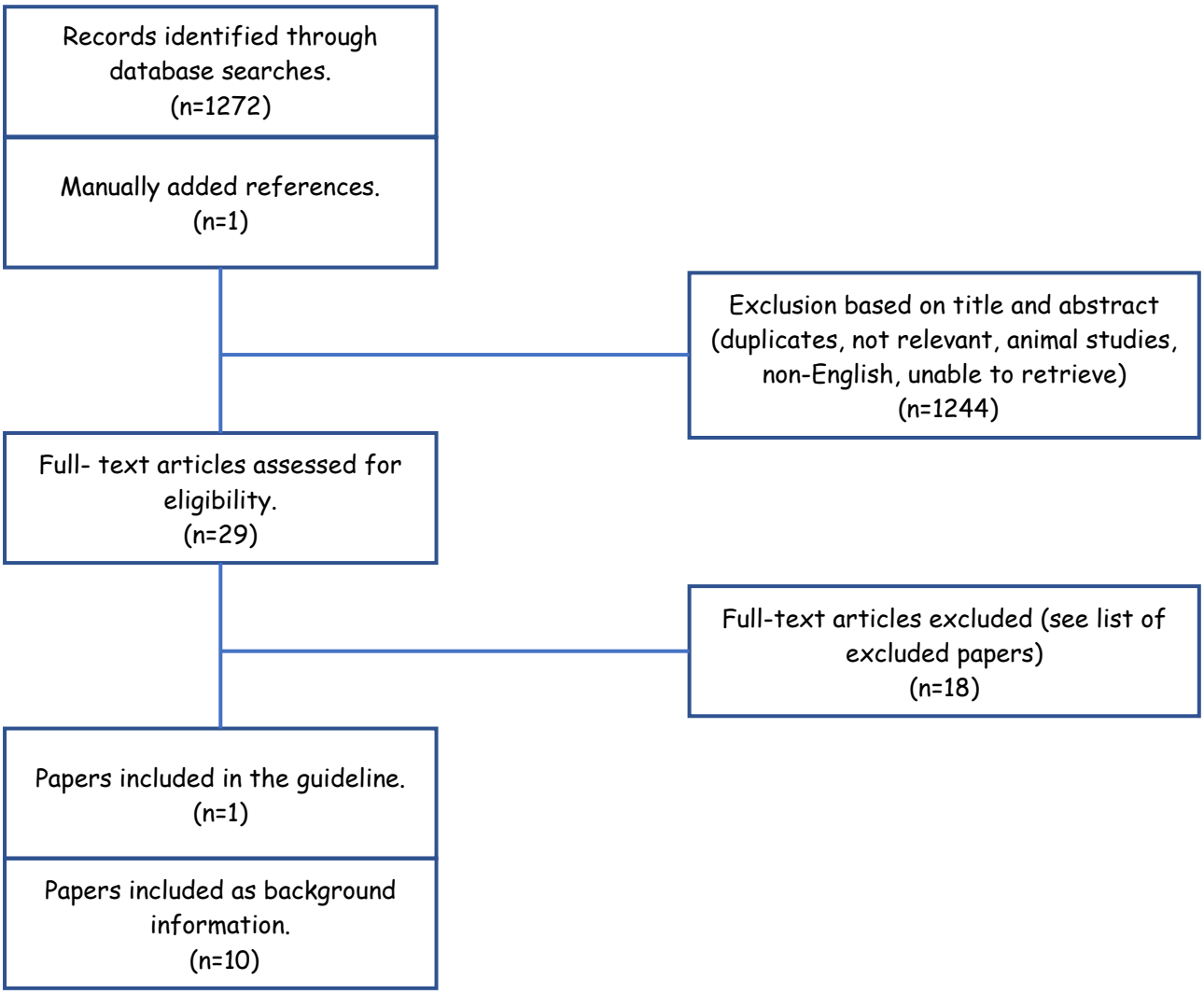
22	Sazonova A, Källen K, Thurin-Kjellberg A, Wennerholm U-B, Bergh C. Neonatal and maternal outcomes comparing women undergoing two in vitro fertilization (IVF) singleton pregnancies and women undergoing one IVF twin pregnancy. Fertility and sterility 2013;99: 731-737.	unrelated to the study question
23	Smith A, Tilling K, Nelson SM, Lawlor DA. Live-Birth Rate Associated With Repeat In Vitro Fertilization Treatment Cycles. Jama 2015;314: 2654-2662.	unrelated to the study question
24	Tannus S, Hatirnaz S, Tan J, Ata B, Tan S-L, Hatirnaz E, Kenat-Pektas M, Dahan M-H. Predictive factors for live birth after in vitro maturation of oocytes in women with polycystic ovary syndrome. Archives of gynecology and obstetrics 2018;297: 199-204.	unrelated to the study question
25	Templeton A, Morris JK. Reducing the risk of multiple births by transfer of two embryos after in vitro fertilization. The New England journal of medicine 1998;339: 573-577.	unrelated to the study question, which is SET versus DET, Duration of infertility was mentioned!
26	Tjon-Kon-Fat RI, Tajik P, Zafarmand MH, Bensdorp AJ, Bossuyt PMM, Oosterhuis GJE, van Golde R, Repping S, Lambers MDA, Slappendel E et al. IVF or IUI as first-line treatment in unexplained subfertility: the conundrum of treatment selection markers. Human reproduction (Oxford, England) 2017;32: 1028-1032.	unrelated to the study question, which is SET versus DET
27	van Loendersloot LL, van Wely M, Repping S, Bossuyt PMM, van der Veen F. Individualized decision-making in IVF: calculating the chances of pregnancy. Human reproduction (Oxford, England) 2013;28: 2972-2980.	unrelated to the study question, duration of infertility not mentioned

PICO 7. Should a previous pregnancy/live birth from ART treatment be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART?

Search strings

PUBMED	("Parity"[Mesh] AND "Previous pregnancy" OR "previous pregnancies" OR " previous live birth" OR "previous pregnancy outcome*" OR "past pregnancy" OR "past pregnancies" OR "previous ART outcome" OR "prior ART" OR "previous assisted reproduction technique" OR " previous gestation*" OR "previous birth" OR "earlier ART" OR multiparous) AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy") AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	("Parity" OR "Previous pregnancy" OR " previous live birth" OR "past pregnancy" OR multiparous) AND (" Embryo transfer" OR SET OR DET) AND ("Live Birth" OR LBR OR "Multiple pregnancy " OR " multiple birth" OR "premature " OR prematurity OR "preterm infant" OR "Maternal Death" OR "maternal morbidity" OR "Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death")

Flowchart



List of excluded studies

	References	Exclusion criteria
1	Aytoz A, Van den Abbeel E, Bonduelle M, Camus M, Joris H, Van Steirteghem A, Devroey P. Obstetric outcome of pregnancies after the transfer of cryopreserved and fresh embryos obtained by conventional in-vitro fertilization and intracytoplasmic sperm injection. Human reproduction (Oxford, England) 1999;14: 2619-2624.	Relevant intervention not included
2	Barsky M, St Marie P, Rahil T, Markenson GR, Sites CK. Are perinatal outcomes affected by blastocyst vitrification and warming? American journal of obstetrics and gynecology 2016;215: 603.e601-603.e605.	Relevant intervention not included
3	Cutting R. Single embryo transfer for all. Best practice & research Clinical obstetrics & gynaecology 2018;53: 30-37.	Relevant intervention not included
4	Davies MJ, Rumbold AR, Marino JL, Willson K, Giles LC, Whitrow MJ, Scheil W, Moran LJ, Thompson JG, Lane M et al. Maternal factors and the risk of birth defects after IVF and ICSI: a whole of population cohort study. BJOG : an international journal of obstetrics and gynaecology 2017;124: 1537-1544.	Relevant intervention not included
5	Faber BM, Mercan R, Hamacher P, Muasher SJ, Toner JP. The impact of an egg donor's age and her prior fertility on recipient pregnancy outcome. Fertility and sterility 1997;68: 370-372.	Relevant intervention not included
6	Goldberg D, Tsafrir A, Srebnik N, Gal M, Margalioth EJ, Mor P, Farkash R, Samueloff A, Eldar-Geva T. How Many Embryos should be Transferred? The Relevance of Parity and Obstetric History. The Israel Medical Association journal: IMAJ 2016;18: 313-317.	Relevant intervention not included
7	Kaandorp SP, van Mens TE, Middeldorp S, Hutten BA, Hof MH, van der Post JA, van der Veen F, Goddijn M. Time to conception and time to live birth in women with unexplained recurrent miscarriage. Human reproduction (Oxford, England) 2014;29: 1146-1152.	Relevant intervention not included
8	Knopman JM, Talebian S, Berkeley AS, Grifo JA, Noyes N, Licciardi F. Fate of cryopreserved donor embryos. Fertility and sterility 2010;94: 1689-1692.	Relevant intervention not included
9	Luke B, Stern JE, Kotelchuck M, Declercq ER, Hornstein MD, Gopal D, Hoang L, Diop H. Adverse pregnancy outcomes after in vitro fertilization: effect of number of embryos transferred and plurality at conception. Fertility and sterility 2015;104: 79-86.	Relevant intervention not included
10	Marsh CA, Farr SL, Chang J, Kissin DM, Grainger DA, Posner SF, Macaluso M, Jamieson DJ. Trends and factors associated with the Day 5 embryo transfer, assisted reproductive technology surveillance, USA, 2001-2009. Human reproduction (Oxford, England) 2012;27: 2325-2331.	Relevant intervention not included
11	Pinborg A, Loft A, Nyboe Andersen A. Neonatal outcome in a Danish national cohort of 8602 children born after in vitro fertilization or intracytoplasmic sperm injection: the role of twin pregnancy. Acta obstetricia et gynecologica Scandinavica 2004;83: 1071-1078.	Relevant intervention not included
12	Sazonova A, Källen K, Thurin-Kjellberg A, Wennerholm U-B, Bergh C. Neonatal and maternal outcomes comparing women undergoing two in vitro fertilization (IVF) singleton pregnancies and women undergoing one IVF twin pregnancy. Fertility and sterility 2013;99: 731-737.	Relevant intervention not included
13	Shibahara H, Hirano Y, Okajima T, Shimada K, Kikuchi K, Suzuki T, Takamizawa S, Suzuki M. Establishment of criteria for elective single embryo transfer at day 2 or day 3 by analyzing cases with successful implantation of all embryos transferred. The journal of obstetrics and gynaecology research 2007;33: 501-505.	Relevant intervention not included
14	Soderstrom-Anttila V, Hovatta O. An oocyte donation program with goserelin down-regulation of voluntary donors. Acta obstetricia et gynecologica Scandinavica 1995;74: 288-292.	Relevant intervention not included
15	Straughen JK, Salihu HM, Keith L, Petrozzino J, Jones C. Obligatory versus elective single embryo transfer in in vitro fertilization. A population-based analysis of data from the U.K. Human Fertilisation and Embryology Authority. The Journal of reproductive medicine 2013;58: 95-100.	Relevant intervention not included
16	Tarín JJ, Pascual E, García-Pérez MA, Gómez R, Hidalgo-Mora JJ, Cano A. A predictive model for women's assisted fecundity before starting the first IVF/ICSI treatment cycle. Journal of assisted reproduction and genetics 2020;37: 171-180.	Relevant intervention not included
17	Wang YA, Costello M, Chapman M, Black D, Sullivan EA. Transfers of fresh blastocysts and blastocysts cultured from thawed cleavage embryos are associated with fewer miscarriages. Reproductive biomedicine online 2011;23: 777-788.	Relevant intervention not included
18	Wang YQ, Yin TL, Xu WM, Qi QR, Wang XC, Yang J. Reproductive outcomes in women with prior cesarean section undergoing in vitro fertilization: A retrospective case-control study. Journal of Huazhong University of Science and Technology Medical sciences. 2017;37: 922-927.	Relevant intervention not included

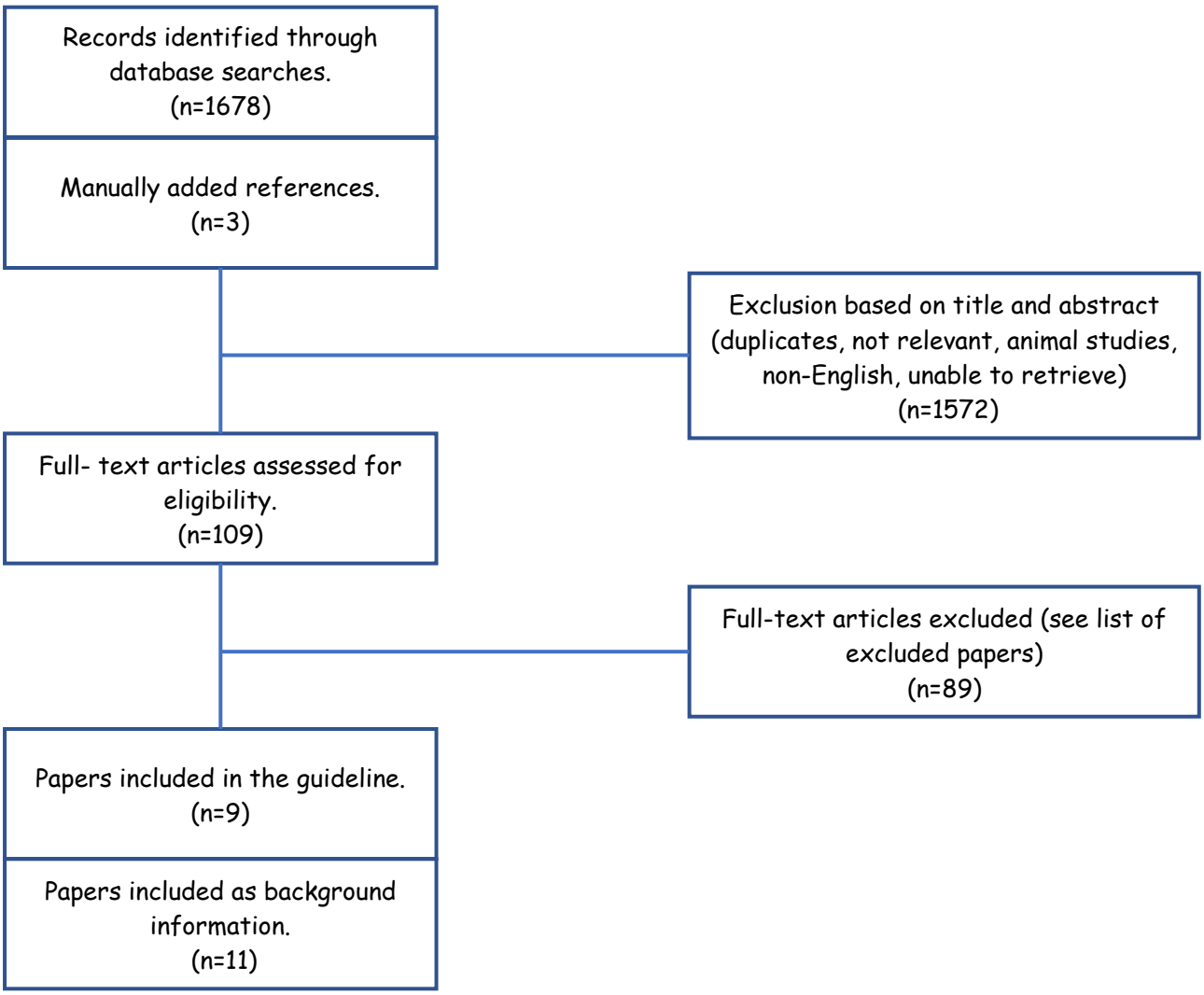
PICO 8. Should female age be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART? If yes, what is the cut off?

Search strings

PUBMED	("Maternal Age"[Mesh] AND "Age Factors"[Mesh] OR " Female age" OR " maternal age" OR "age of the mother" OR " mother age") AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo

	transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))
COCHRANE	("Maternal Age" OR "Age Factors" OR “ Female age” OR “ mother age”) AND ("Single Embryo Transfer" AND "Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer") AND ("Live Birth” OR LBR OR “Multiple pregnancy ” OR “ multiple birth” OR "premature " OR prematurity OR “preterm infant” OR "Maternal Death" OR “maternal morbidity” OR "Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death”)

Flowchart



List of excluded studies

Nr	reference	Exclusion criteria
1	Acharya KS, Keyhan S, Acharya CR, Yeh JS, Provost MP, Goldfarb JM, Muasher SJ. Do donor oocyte cycles comply with ASRM/SART embryo transfer guidelines? An analysis of 13,393 donor cycles from the SART registry. Fertility and sterility 2016;106: 603-607.	Included in the donor cycle chapter
2	Alasmari NM, Son WY, Dahan MH. The effect on pregnancy and multiples of transferring 1-3 embryos in women at least 40 years old. Journal of assisted reproduction and genetics 2016;33: 1195-1202.	Low quality study

3	Arthur ID, Anthony FW, Masson GM, Thomas EJ. The selection criteria on an IVF program can remove the association between maternal age and implantation. Acta obstetricia et gynecologica Scandinavica 1994;73: 562-566.	Not relevant for this PICO
4	Avnon T, Ovental A, Many A. Twin versus singleton pregnancy in women ≥ 45 years of age: comparison of maternal and neonatal outcomes. The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet 2021;34: 201-206.	Not relevant for this PICO
5	Bdolah Y, Zemet R, Aizenman E, Lossos F, Abram TB, Shufaro Y. Frozen-Thawed Embryo Transfer Success Rate is Affected by Age and Ovarian Response at Oocyte Aspiration Regardless of Blastomere Survival Rate. JBRA assisted reproduction 2015;19: 210-215.	The population is not relevant, study of embryo quality
6	Bhattacharya S, Maheshwari A, Mollison J. Factors associated with failed treatment: an analysis of 121,744 women embarking on their first IVF cycles. PloS one 2013;8: e82249.	Not relevant for this PICO
7	Chambers GM, Paul RC, Harris K, Fitzgerald O, Boothroyd CV, Rombauts L, Chapman MG, Jorm L. Assisted reproductive technology in Australia and New Zealand: cumulative live birth rates as measures of success. The Medical journal of Australia 2017;207: 114-118.	Not SET vs DET
8	Chambers GM, Wand H, Macaldowie A, Chapman MG, Farquhar CM, Bowman M, Molloy D, Ledger W. Population trends and live birth rates associated with common ART treatment strategies. Human reproduction (Oxford, England) 2016;31: 2632-2641.	Analysis of success rates over time
9	Cohen J, Alikani M, Bisignano A. Past performance of assisted reproduction technologies as a model to predict future progress: a proposed addendum to Moore's law. Reproductive biomedicine online 2012;25: 585-590.	Analysis of implantation rate over time
10	Dal Canto M, Bartolacci A, Turchi D, Pignataro D, Lain M, De Ponti E, Brigante C, Mignini Renzini M, Buratini J. Faster fertilization and cleavage kinetics reflect competence to achieve a live birth after intracytoplasmic sperm injection, but this association fades with maternal age. Fertility and sterility 2020.	Not relevant for this PICO
11	Davies MJ, Rumbold AR, Marino JL, Willson K, Giles LC, Whitrow MJ, Scheil W, Moran LJ, Thompson JG, Lane M et al. Maternal factors and the risk of birth defects after IVF and ICSI: a whole of population cohort study. BJOG : an international journal of obstetrics and gynaecology 2017;124: 1537-1544.	Study of birth defects
12	Dziadosz M, Evans MI. Re-Thinking Elective Single Embryo Transfer: Increased Risk of Monochorionic Twinning - A Systematic Review. Fetal diagnosis and therapy 2017;42: 81-91.	Not relevant for this question
13	Engmann L, Maconochie N, Tan SL, Bekir J. Trends in the incidence of births and multiple births and the factors that determine the probability of multiple birth after IVF treatment. Human reproduction (Oxford, England) 2001;16: 2598-2605.	Not SET vs DET
14	Ercan CM, Kerimoglu OS, Sakinci M, Korkmaz C, Duru NK, Ergun A. Pregnancy outcomes in a university hospital after legal requirement for single-embryo transfer. European journal of obstetrics, gynecology, and reproductive biology 2014;175: 163-166.	Included in the meta-analysis Ma et al 2022
15	Esposito G, Somigliana E, Franchi M, Dallagiovanna C, Pisaturo V, Corrao G, Parazzini F. Trend of medically induced monozygotic twin deliveries according to age, parity, and type of assisted reproductive technique during the period 2007-2017 in Lombardy Region, Northern Italy: a population-based study. Journal of assisted reproduction and genetics 2021;38: 2341-2347.	Not relevant for this PICO
16	Faber BM, Mercan R, Hamacher P, Muasher SJ, Toner JP. The impact of an egg donor's age and her prior fertility on recipient pregnancy outcome. Fertility and sterility 1997;68: 370-372.	Study of egg donation
17	Fernando D, Halliday JL, Breheny S, Healy DL. Outcomes of singleton births after blastocyst versus nonblastocyst transfer in assisted reproductive technology. Fertility and sterility 2012;97: 579-584.	Study of embryo quality
18	Filicori M, Cognigni GE, Gamberini E, Troilo E, Parmegiani L, Bernardi S. Impact of medically assisted fertility on preterm birth. BJOG : an international journal of obstetrics and gynaecology 2005;112 Suppl 1: 113-117.	Review including data before 2005
19	Fujimoto A, Morishima K, Harada M, Hirata T, Osuga Y, Fujii T. Elective single-embryo transfer improves cumulative pregnancy outcome in young patients but not in women of advanced reproductive age. Journal of assisted reproduction and genetics 2015;32: 1773-1779.	Not SET vs DET
20	Garrido N, Bellver J, Remohi J, Simon C, Pellicer A. Cumulative live-birth rates per total number of embryos needed to reach newborn in consecutive in vitro fertilization (IVF) cycles: a new approach to measuring the likelihood of IVF success. Fertility and sterility 2011;96: 40-46.	Not SET vs DET
21	Gelbaya TA, Tsoumpou I, Nardo LG. The likelihood of live birth and multiple birth after single versus double embryo transfer at the cleavage stage: a systematic review and meta-analysis. Fertility and sterility 2010;94: 936-945.	More recent systematic review
22	Gerris JM. Single embryo transfer and IVF/ICSI outcome: a balanced appraisal. Human reproduction update 2005;11: 105-121.	Included in Ma et al. 2022
23	Guesdon E, Vincent-Rohfritsch A, Bydlowski S, Santulli P, Goffinet F, Le Ray C. Oocyte donation recipients of very advanced age: perinatal complications for singletons and twins. Fertility and sterility 2017;107: 89-96.	Not SET vs DET
24	Hara T, Katsuki T, Kusuda T, Ohama K. Pregnancy rate, multiple pregnancy rate, and embryo quality: Clues for single blastocyst transfer from double blastocyst transfer in an unselected population. Reproductive medicine and biology 2005;4: 153-160.	Included in Ma et al. 2022
25	Holte J, Berglund L, Milton K, Garello C, Gennarelli G, Revelli A, Bergh T. Construction of an evidence-based integrated morphology cleavage embryo score for implantation potential of embryos scored and transferred on day 2 after oocyte retrieval. Human reproduction (Oxford, England) 2007;22: 548-557.	Prediction model
26	Huang X, Liu R, Shen W, Cai Y, Ding M, Sun H, Zhou J. An elective single cleavage embryo transfer strategy to minimize twin live birth rate based on a prediction model from double cleavage embryos transfer patients. The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet 2020: 1-8.	This study is included in part B.V
27	Huang Y, Li J, Zhang F, Liu Y, Xu G, Guo J, Zhang R, Wu Y, Liu J, Chen K et al. Factors affecting the live-birth rate in women with diminished ovarian reserve undergoing IVF-ET. Archives of gynecology and obstetrics 2018;298: 1017-1027.	Not relevant for this question
28	Hull MG, Fleming CF, Hughes AO, McDermott A. The age-related decline in female fecundity: a quantitative controlled study of implanting capacity and survival of individual embryos after in vitro fertilization. Fertility and sterility 1996;65: 783-790.	Not SET vs DET
29	Keyhan S, Acharya KS, Acharya CR, Yeh JS, Provost MP, Goldfarb JM, Muasher SJ. How compliant are in vitro fertilization member clinics in following embryo transfer guidelines? An analysis of 59,689 fresh first in vitro fertilization autologous cycles from 2011 to 2012. Fertility and sterility 2016;106: 645-652.e641.	Included in Ma et al. 2022

30	Kissin DM, Kulkarni AD, Kushnir VA, Jamieson DJ. Number of embryos transferred after in vitro fertilization and good perinatal outcome. Obstetrics and gynecology 2014;123: 239-247.	No relevant outcomes
31	Kupka MS, Dorn C, Richter O, Felberbaum R, van der Ven H. Impact of reproductive history on in vitro fertilization and intracytoplasmic sperm injection outcome: evidence from the German IVF Registry. Fertility and sterility 2003;80: 508-516.	Not SET vs DET
32	Lee TH, Chen CD, Tsai YY, Chang LJ, Ho HN, Yang YS. Embryo quality is more important for younger women whereas age is more important for older women with regard to in vitro fertilization outcome and multiple pregnancy. Fertility and sterility 2006;86: 64-69.	Not SET vs DET
33	Leijdekkers JA, Eijkemans MJC, van Tilborg TC, Oudshoorn SC, van Golde RJT, Hoek A, Lambalk CB, de Bruin JP, Fleischer K, Mochtar MH et al. Cumulative live birth rates in low-prognosis women. Human reproduction (Oxford, England) 2019;34: 1030-1041.	Study of egg donation
34	Levran D, Goldstein I, Dor J, Mashiach S, Bider D. Parameters that influence the results of in vitro fertilization/embryo transfer: a study of an egg donation model. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 1996;10: 401-406.	Study of endometrium
35	Liu J, Zheng J, Lei Y-L, Wen X-F. Effects of endometrial preparations and transferred embryo types on pregnancy outcome from patients with advanced maternal age. Systems biology in reproductive medicine 2019;65: 181-186.	Not SET vs DET
36	Liu X, Shi J. Maternal age is associated with embryo splitting after single embryo transfer: a retrospective cohort study. Journal of assisted reproduction and genetics 2021;38: 79-83.	Not SET vs DET
37	Long X, Wang Y, Wu F, Li R, Chen L, Qian W, Qiao J. Pregnancy Outcomes of Single/Double Blastocysts and Cleavage Embryo Transfers: a Retrospective Cohort Study of 24,422 Frozen-Thawed Cycles. Reproductive sciences (Thousand Oaks, Calif) 2020;27: 2271-2278.	Double cleavage stage embryos vs single blastocyst embryo transfer
38	López-Regalado ML, Clavero A, Gonzalvo MC, Serrano M, Martínez L, Mozas J, Rodríguez-Serrano F, Fontes J, Castilla JA. Randomised clinical trial comparing elective single-embryo transfer followed by single-embryo cryotransfer versus double embryo transfer. European journal of obstetrics, gynecology, and reproductive biology 2014;178: 192-198.	Included in Ma et al. 2022
39	Luke B, Brown MB, Grainger DA, Cedars M, Klein N, Stern JE. Practice patterns and outcomes with the use of single embryo transfer in the United States. Fertility and sterility 2010;93: 490-498.	Not relevant for this PICO
40	Luke B, Stern JE, Kotelchuck M, Declercq ER, Hornstein MD, Gopal D, Hoang L, Diop H. Adverse pregnancy outcomes after in vitro fertilization: effect of number of embryos transferred and plurality at conception. Fertility and sterility 2015;104: 79-86.	Not relevant for this PICO
41	Martin C, Chang J, Boulet S, Jamieson DJ, Kissin D. Factors predicting double embryo implantation following double embryo transfer in assisted reproductive technology: implications for elective single embryo transfer. Journal of assisted reproduction and genetics 2016;33: 1343-1353.	No relevant outcomes
42	McLernon DJ, Harrild K, Bergh C, Davies MJ, de Neubourg D, Dumoulin JC, Gerris J, Kremer JA, Martikainen H, Mol BW et al. Clinical effectiveness of elective single versus double embryo transfer: meta-analysis of individual patient data from randomised trials. BMJ (Clinical research ed) 2010;341: c6945.	Included in Ma et al. 2022
43	McPherson NO, Zander-Fox D, Vincent AD, Lane M. Combined advanced parental age has an additive negative effect on live birth rates-data from 4057 first IVF/ICSI cycles. Journal of assisted reproduction and genetics 2018;35: 279-287.	Not SET vs DET
44	Minaretzis D, Harris D, Alper MM, Mortola JF, Berger MJ, Power D. Multivariate analysis of factors predictive of successful live births in in vitro fertilization (IVF) suggests strategies to improve IVF outcome. Journal of assisted reproduction and genetics 1998;15: 365-371.	Not SET vs DET
45	Mor N, Machtinger R, Yinon Y, Toussia-Cohen S, Amitai Komem D, Levin M, Sivan E, Meyer R. Outcome of two sequential singleton pregnancies and twin pregnancies among primiparous women at advanced age undergoing IVF. Archives of gynecology and obstetrics 2020;302: 1113-1119.	Not SET vs. DET
46	Moragianni VA, Penzias AS. Cumulative live-birth rates after assisted reproductive technology. Current opinion in obstetrics & gynecology 2010;22: 189-192.	Narrative review
47	Naasan M, Waterstone J, Johnston MM, Nolan A, Egan D, Shamoun O, Thompson W, Roopnarinesingh R, Wingfield M, Harrison RF et al. Assisted reproductive technology treatment outcomes. Irish medical journal 2012;105: 136-139.	Analysis of age, only report of activities
48	Oron G, Sokal-Arnon T, Son WY, Demirtas E, Buckett W, Zeadna A, Holzer H, Tulandi T. Extended embryo culture is not associated with increased adverse obstetric or perinatal outcome. American journal of obstetrics and gynecology 2014;211: 165.e161-167.	Study of extended embryo culture
49	Ozgur K, Bulut H, Berkkanoglu M, Donmez L, Coetzee K. Prediction of live birth and cumulative live birth rates in freeze-all-IVF treatment of a general population. Journal of assisted reproduction and genetics 2019;36: 685-696.	Study of freeze-all
50	Pal L, Jindal S, Witt BR, Santoro N. Less is more: increased gonadotropin use for ovarian stimulation adversely influences clinical pregnancy and live birth after in vitro fertilization. Fertility and sterility 2008;89: 1694-1701.	Study of ovarian stimulation
51	Pandian Z, Bhattacharya S, Ozturk O, Serour G, Templeton A. Number of embryos for transfer following in-vitro fertilisation or intra-cytoplasmic sperm injection. The Cochrane database of systematic reviews 2009: Cd003416.	More recent update
52	Paulson RJ, Hatch IE, Lobo RA, Sauer MV. Cumulative conception and live birth rates after oocyte donation: implications regarding endometrial receptivity. Human reproduction (Oxford, England) 1997;12: 835-839.	Study of egg donation
53	Pelkonen S, Gissler M, Koivurova S, Lehtinen S, Martikainen H, Hartikainen AL, Tiitinen A. Physical health of singleton children born after frozen embryo transfer using slow freezing: a 3-year follow-up study. Human reproduction (Oxford, England) 2015;30: 2411-2418.	Study of fresh vs frozen ET
54	Pinborg A, Loft A, Nyboe Andersen A. Neonatal outcome in a Danish national cohort of 8602 children born after in vitro fertilization or intracytoplasmic sperm injection: the role of twin pregnancy. Acta obstetricia et gynecologica Scandinavica 2004;83: 1071-1078.	Not relevant for this PICO, study of children outcome
55	Porter M, Peddie V, Bhattacharya S. Debate: do upper age limits need to be imposed on women receiving assisted reproduction treatment? Human fertility (Cambridge, England) 2007;10: 87-92.	Review/expert opinion
56	Roberts SA, Hirst WM, Brison DR, Vail A. Embryo and uterine influences on IVF outcomes: an analysis of a UK multi-centre cohort. Human reproduction (Oxford, England) 2010;25: 2792-2802.	Included in Ma et al. 2022
57	Sauer MV, Paulson RJ, Lobo RA. Reversing the natural decline in human fertility. An extended clinical trial of oocyte donation to women of advanced reproductive age. Jama 1992;268: 1275-1279.	Small sample size – oocyte donation

58	Sazonova A, Källen K, Thurin-Kjellberg A, Wennerholm U-B, Bergh C. Neonatal and maternal outcomes comparing women undergoing two in vitro fertilization (IVF) singleton pregnancies and women undergoing one IVF twin pregnancy. Fertility and sterility 2013;99: 731-737.	Results adjusted for age
59	Schieve LA, Peterson HB, Meikle SF, Jeng G, Danel I, Burnett NM, Wilcox LS. Live-birth rates and multiple-birth risk using in vitro fertilization. Jama 1999;282: 1832-1838.	Not SET vs DET
60	Schoolcraft WB, Katz-Jaffe MG. Comprehensive chromosome screening of trophectoderm with vitrification facilitates elective single-embryo transfer for infertile women with advanced maternal age. *Fertility and sterility* 2013;100: 615-619.	Narrative review
61	Seppala M. The world collaborative report on in vitro fertilization and embryo replacement: current state of the art in January 1984. Annals of the New York Academy of Sciences 1985;442: 558-563.	Low quality questionnaire
62	Sifer C, Sermondade N, Poncelet C, Hafhouf E, Porcher R, Cedrin-Durnerin I, Benzacken B, Levy R, Hugues JN. Biological predictive criteria for clinical pregnancy after elective single embryo transfer. Fertility and sterility 2011;95: 427-430.	No relevant outcomes
63	Simon AL, Kiehl M, Fischer E, Proctor JG, Bush MR, Givens C, Rabinowitz M, Demko ZP. Pregnancy outcomes from more than 1,800 in vitro fertilization cycles with the use of 24-chromosome single-nucleotide polymorphism-based preimplantation genetic testing for aneuploidy. Fertility and sterility 2018;110: 113-121.	Study of SNP
64	Skora D, Frankfurter D. Adverse perinatal events associated with ART. Seminars in reproductive medicine 2012;30: 84-91.	Review
65	Smith A, Tilling K, Lawlor DA, Nelson SM. Live birth rates and perinatal outcomes when all embryos are frozen compared with conventional fresh and frozen embryo transfer: a cohort study of 337,148 in vitro fertilisation cycles. BMC medicine 2019;17: 202.	Not SET vs DET
66	Stanger JD, Yovich JL. Follicle recruitment determines IVF productivity rate via the number of embryos frozen and subsequent transfers. Reproductive biomedicine online 2013;27: 286-296.	Study of age on oocytes retrieved and cycle efficacy
67	Steinberg ML, Boulet S, Kissin D, Warner L, Jamieson DJ. Elective single embryo transfer trends and predictors of a good perinatal outcome--United States, 1999 to 2010. Fertility and sterility 2013;99: 1937-1943.	Not SET vs. DET
68	Stone BA, March CM, Ringler GE, Baek KJ, Marrs RP. Casting for determinants of blastocyst yield and of rates of implantation and of pregnancy after blastocyst transfers. Fertility and sterility 2014;102: 1055-1064.	Study of embryo selection
69	Strandell A, Bergh C, Lundin K. Selection of patients suitable for one-embryo transfer may reduce the rate of multiple births by half without impairment of overall birth rates. Human reproduction (Oxford, England) 2000;15: 2520-2525.	Not relevant for this PICO
70	Stromberg B, Dahlquist G, Ericson A, Finnstrom O, Koster M, Stjernqvist K. Neurological sequelae in children born after in-vitro fertilisation: a population-based study. Lancet (London, England) 2002;359: 461-465.	Study of children outcome
71	Styer AK, Wright DL, Wolkovich AM, Veiga C, Toth TL. Single-blastocyst transfer decreases twin gestation without affecting pregnancy outcome. Fertil Steril. 2008;89:1702–8.	Included in Ma et al. 2022
72	Styer AK, Luke B, Vitek W, Christianson MS, Baker VL, Christy AY, Polotsky AJ. Factors associated with the use of elective single-embryo transfer and pregnancy outcomes in the United States, 2004-2012. Fertility and sterility 2016;106: 80-89.	Not relevant for this PICO
73	Templeton A, Morris JK. Reducing the risk of multiple births by transfer of two embryos after in vitro fertilization. The New England journal of medicine 1998;339: 573-577.	Not SET vs DET
74	Thum MY, Wells V, Abdalla H. Patient selection criteria for blastocyst culture in IVF/ICSI treatment. Journal of assisted reproduction and genetics 2010;27: 555-560.	Study on embryo quality
75	Thurin A, Hausken J, Hillensjo T, Jablonowska B, Pinborg A, Strandell A, Bergh C. Elective single-embryo transfer versus double-embryo transfer in in vitro fertilization. The New England journal of medicine 2004;351: 2392-2402.	Included in Ma et al. 2022
76	Toftager M, Bogstad J, Lossl K, Praetorius 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. Human reproduction (Oxford, England) 2017;32: 556-567.	Not SET vs. DET
77	Torrealday S. Is the fertility treatment itself a risk factor for early pregnancy loss? Current opinion in obstetrics & gynecology 2014;26: 174-180.	Review on early pregnancy loss
78	Tsoumpou I, Gelbaya T, Nardo L. The likelihood of live birth and multiple births after single versus multiple embryo transfer: a systematic review and meta-analysis. International journal of gynaecology and obstetrics 2009;107: S363	More recent systematic review
79	Ubaldi FM, Capalbo A, Colamaria S, Ferrero S, Maggiulli R, Vajta G, Sapienza F, Cimadomo D, Giuliani M, Gravotta E et al. Reduction of multiple pregnancies in the advanced maternal age population after implementation of an elective single embryo transfer policy coupled with enhanced embryo selection: pre- and post-intervention study. Human reproduction (Oxford, England) 2015;30: 2097-2106.	Study on embryo quality
80	Ubaldi FM, Cimadomo D, Vaiarelli A, Fabozzi G, Venturella R, Maggiulli R, Mazzilli R, Ferrero S, Palagiano A, Rienzi L. Advanced Maternal Age in IVF: Still a Challenge? The Present and the Future of Its Treatment. Frontiers in endocrinology 2019;10: 94-94.	Reproductive aging no reference to number of embryos to transfer
81	Umstad MP, Hale L, Wang YA, Sullivan EA. Multiple deliveries: the reduced impact of in vitro fertilisation in Australia. The Australian & New Zealand journal of obstetrics & gynaecology 2013;53: 158-164.	No relevant intervention
82	Vaegter KK, Berglund L, Tilly J, Hadziosmanovic N, Brodin T, Holte J. Construction and validation of a prediction model to minimize twin rates at preserved high live birth rates after IVF. Reproductive biomedicine online 2019;38: 22-29.	No relevant population
83	van Loendersloot L, van Wely M, Goddijn M, Repping S, Bossuyt P, van der Veen F. Pregnancy and twinning rates using a tailored embryo transfer policy. Reproductive biomedicine online 2013;26: 462-469.	Small sample size
84	van Montfoort AP, Fiddelers AA, Janssen JM, Derhaag JG, Dirksen CD, Dunselman GA, Land JA, Geraedts JP, Evers JL, Dumoulin JC. In unselected patients, elective single embryo transfer prevents all multiples, but results in significantly lower pregnancy rates compared with double embryo transfer: a randomized controlled trial. Human reproduction (Oxford, England) 2006;21: 338-343.	Included in Ma et al. 2022
85	Veleva Z, Orava M, Nuojua-Huttunen S, Tapanainen JS, Martikainen H. Factors affecting the outcome of frozen-thawed embryo transfer. Human reproduction (Oxford, England) 2013;28: 2425-2431.	Not SET vs DET
86	Wang YA, Costello M, Chapman M, Black D, Sullivan EA. Transfers of fresh blastocysts and blastocysts cultured from thawed cleavage embryos are associated with fewer miscarriages. Reproductive biomedicine online 2011;23: 777-788.	Study of embryo quality

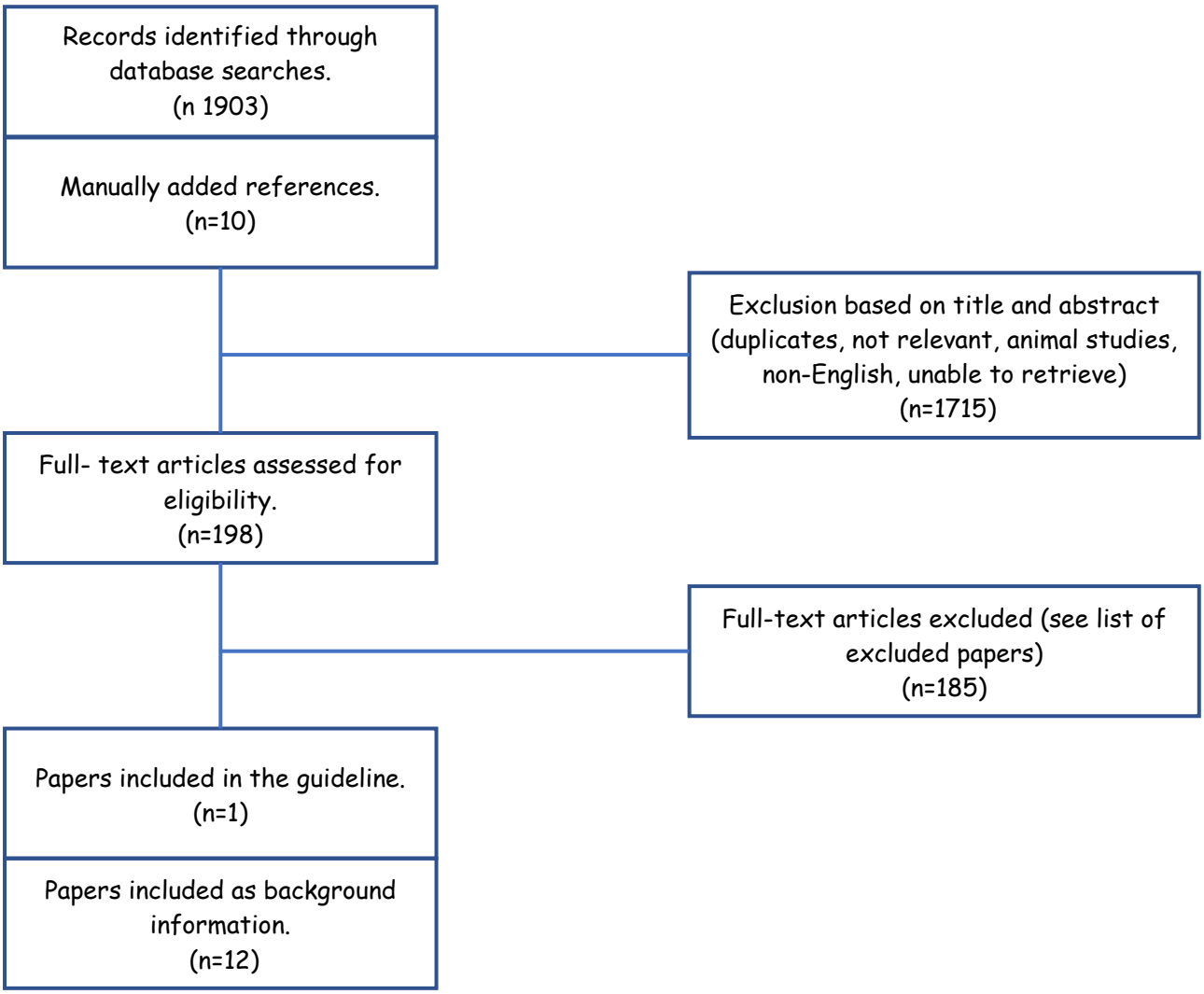
87	Yang R, Yang S, Li R, Chen X, Wang H, Ma C, Liu P, Qiao J. Biochemical pregnancy and spontaneous abortion in first IVF cycles are negative predictors for subsequent cycles: an over 10,000 cases cohort study. Archives of gynecology and obstetrics 2015;292: 453-458.	Not relevant for this PICO
88	Yin H, Jiang H, He R, Wang C, Zhu J, Cao Z. Cumulative live birth rate of advanced-age women more than 40 with or without poor ovarian response. Taiwanese journal of obstetrics & gynecology 2019;58: 201-205.	Not SET vs. DET
89	Zhang M, Bu T, Tian H, Li X, Wang D, Wan X, Wang Q, Mao X, La X. Use of Cumulative Live Birth Rate per Total Number of Embryos to Calculate the Success of IVF in Consecutive IVF Cycles in Women Aged >/=35 Years. BioMed research international 2019;2019: 6159793.	Included in Ma et al. 2022

PICO 9. Should ovarian response (i.e. low, normal or high) be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART? If yes, what is the appropriate transfer strategy for low, normal, or high responders?

Search strings

PUBMED	("Ovulation Induction"[Mesh] AND "Superovulation"[Mesh] AND "Oocyte Retrieval"[Mesh] OR " Ovarian Stimulation" OR "controlled ovarian hyperstimulation" OR "ovary stimulation" OR "low ovarian response" OR " poor ovarian response" OR "low responder" OR "decreased oocyte production" OR "Ovarian failure" OR "suboptimal response" OR "suboptimal responder" OR "normal ovarian response" OR "optimal response" OR "high ovarian response" OR "high-responder" OR "high response" OR "excessive response" OR "final maturation induction" OR "follicle stimulating hormone") AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy") AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	("Ovulation Induction" OR "Superovulation" OR "Oocyte Retrieval" OR " Ovarian Stimulation" OR "controlled ovarian hyperstimulation" OR "ovary stimulation" OR "low ovarian response" OR " poor ovarian response" OR "low responder" OR "normal ovarian response" OR "optimal response" OR "high ovarian response" OR "high-responder") AND ("Single Embryo Transfer" AND "Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer") AND ("Live Birth" OR LBR OR "Multiple pregnancy " OR " multiple birth" OR "premature " OR prematurity OR "preterm infant" OR "Maternal Death" OR "maternal morbidity" OR "Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death")

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Abdullah RK, Liu N, Zhao Y, Shuang Y, Shen Z, Zeng H, Wu J. Cumulative live-birth, perinatal and obstetric outcomes for POSEIDON groups after IVF/ICSI cycles: a single-center retrospective study. Scientific reports 2020;10: 11822.	No relevant population
2	Acet M, Aktun LH, Basaranoglu S, Yorgunlar B, Acet T, Deregozu A. Premature Progesterone Elevation Does Not Affect Pregnancy Outcome in High-Responder Patients Undergoing Short-Interval Coasting in IVF Cycles. Medical science monitor basic research 2015;21: 247-252.	No relevant population
3	Aksoy S, Yakin K, Seyhan A, Oktem O, Alatas C, Ata B, Urman B. Does the use of gonadotropin-releasing hormone antagonists in natural IVF cycles for poor responder patients cause more harm than benefit? Human fertility (Cambridge, England) 2016;19: 97-101.	No relevant outcomes
4	Al-Azemi M, Bernal AL, Steele J, Gramsbergen I, Barlow D, Kennedy S. Ovarian response to repeated controlled stimulation in in-vitro fertilization cycles in patients with ovarian endometriosis. Human reproduction (Oxford, England) 2000;15: 72-75.	No relevant outcomes
5	al-Mizyen E, Sabatini L, Lower AM, Wilson CM, al-Shawaf T, Grudzinskas JG. Does pretreatment with progestogen or oral contraceptive pills in low responders followed by the GnRHa flare protocol improve the outcome of IVF-ET? Journal of assisted reproduction and genetics 2000;17: 140-146.	No relevant outcomes
6	Al-Turki HA. Dehydroepiandrosterone supplementation in women undergoing assisted reproductive technology with poor ovarian response. A prospective case-control study. The Journal of international medical research 2018;46: 143-149.	No relevant outcomes
7	Alvarez RM, Ramanathan P. Fertility preservation in female oncology patients: the influence of the type of cancer on ovarian stimulation response. Human reproduction (Oxford, England) 2018;33: 2051-2059.	No relevant outcomes
8	Alviggi C, Conforti A, Esteves SC, Andersen CY, Bosch E, Buhler K, Ferraretti AP, De Placido G, Mollo A, Fischer R et al. Recombinant luteinizing hormone supplementation in assisted reproductive technology: a systematic review. Fertility and sterility 2018;109: 644-664.	No relevant population
9	Anderson-Sykes S, Dunphy BC, Pattinson HA, Jarrell J, Zhang XQ. Factors predicting outcome in 215 consecutive thawed embryo replacements. Fertility and sterility 1994;61: 1156-1157.	No relevant outcomes

10	Ata B, Seli E. A universal freeze all strategy: why it is not warranted. Current opinion in obstetrics & gynecology 2017;29: 136-145.	No relevant population
11	Avrech OM, Orvieto R, Pinkas H, Sapir-Rufas O, Feldberg D, Fisch B. Inclusion of standard and low-dose gonadotropin releasing hormone-analog (short protocol) in controlled ovarian hyperstimulation regimens in normogonadotropic patients aged 40-48 years who are undergoing in vitro fertilization. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2004;19: 247-252.	No relevant outcomes
12	Balassiano E, Malik S, Vaid P, Knochenhauer ES, Traub ML. The presence of multiple gestational sacs confers a higher live birth rate in women with infertility who achieve a positive pregnancy test after fresh and frozen embryo transfer: a retrospective local cohort. Reproductive biology and endocrinology : RB&E 2014;12: 104.	No relevant population
13	Barrenetxea G, Agirregoikoa JA, Jimenez MR, de Larruzea AL, Ganzabal T, 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. Fertility and sterility 2008;89: 546-553.	No relevant outcomes
14	Bassiouny YA, Dakhly DMR, Bayoumi YA, Hashish NM. Does the addition of growth hormone to the in vitro fertilization/intracytoplasmic sperm injection antagonist protocol improve outcomes in poor responders? A randomized, controlled trial. Fertility and sterility 2016;105: 697-702.	No relevant outcomes
15	Beall SA, DeCherney A. History and challenges surrounding ovarian stimulation in the treatment of infertility. Fertility and sterility 2012;97: 795-801.	No relevant outcomes
16	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 in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology 2017;50: 315-323.	No relevant outcomes
17	Begueria R, Garcia D, Vassena R, Rodriguez A. Medroxyprogesterone acetate versus ganirelix in oocyte donation: a randomized controlled trial. Human reproduction (Oxford, England) 2019;34: 872-880.	No relevant outcomes
18	Bergh C, Howles CM, Borg K, Hamberger L, Josefsson B, Nilsson L, 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. Human reproduction (Oxford, England) 1997;12: 2133-2139.	No relevant population
19	Berkkanoglu M, Coetzee K, Bulut H, Ozgur K. Optimal embryo transfer strategy in poor response may include freeze-all. Journal of assisted reproduction and genetics 2017;34: 79-87.	No relevant population
20	Bodri D, Nair S, Gill A, Lamanna G, Rahmati M, Arian-Schad M, Smith V, Linara E, Wang J, Macklon N et al. Shared motherhood IVF: high delivery rates in a large study of treatments for lesbian couples using partner-donated eggs. Reproductive biomedicine online 2018;36: 130-136.	No relevant population
21	Bosch E, Labarta E, Kolibianakis E, Rosen M, Meldrum D. Regimen of ovarian stimulation affects oocyte and therefore embryo quality. Fertility and sterility 2016;105: 560-570.	No relevant population
22	Bosdou JK, Venetis CA, Tarlatzis BC, Grimbizis GF, Kolibianakis EM. Higher probability of live-birth in high, but not normal, responders after first frozen-embryo transfer in a freeze-only cycle strategy compared to fresh-embryo transfer: a meta-analysis. Human reproduction (Oxford, England) 2019;34: 491-505.	No relevant population
23	Briggs R, Kovacs G, MacLachlan V, Motteram C, Baker HW. Can you ever collect too many oocytes? Human reproduction (Oxford, England) 2015;30: 81-87.	No relevant population
24	Brodin T, Hadziosmanovic N, Berglund L, Olovsson M, Holte J. Comparing four ovarian reserve markers--associations with ovarian response and live births after assisted reproduction. Acta obstetricia et gynecologica Scandinavica 2015;94: 1056-1063.	No relevant outcomes
25	Cabry R, Merviel P, Hazout A, Belloc S, Dalleac A, Copin H, Benkhalifa M. Management of infertility in women over 40. Maturitas 2014;78: 17-21.	No relevant population
26	Chang JC, Chen MJ, Guu HF, Chen YF, Yi YC, Kung HF, Chen LY, Chou MM. Does the "freeze-all" policy allow for a better outcome in assisted reproductive techniques than the use of fresh embryo transfers? - A retrospective study on cumulative live birth rates. Taiwanese journal of obstetrics & gynecology 2017;56: 775-780.	No relevant outcomes
27	Check JH, O'Shaughnessy A, Lurie D, Fisher C, Adelson HG. Evaluation of the mechanism for higher pregnancy rates in donor oocyte recipients by comparison of fresh with frozen embryo transfer pregnancy rates in a shared oocyte programme. Human reproduction (Oxford, England) 1995;10: 3022-3027.	No relevant outcomes
28	Chen QJ, Sun XX, Li L, Gao XH, Wu Y, Gemzell-Danielsson K, Cheng LN. Effects of ovarian high response on implantation and pregnancy outcome during controlled ovarian hyperstimulation (with GnRH agonist and rFSH). Acta obstetricia et gynecologica Scandinavica 2007;86: 849-854.	No relevant population
29	Chen SN, Tsui KH, Wang PH, Chern CU, Wen ZH, Lin LT. Dehydroepiandrosterone Supplementation Improves the Outcomes of in vitro Fertilization Cycles in Older Patients With Diminished Ovarian Reserve. Frontiers in endocrinology 2019;10: 800.	No relevant population
30	Chen H, Wang Y, Lyu Q, Ai A, Fu Y, Tian H, Cai R, Hong Q, Chen Q, Shoham Z et al. Comparison of live-birth defects after luteal-phase ovarian stimulation vs. conventional ovarian stimulation for in vitro fertilization and vitrified embryo transfer cycles. Fertility and sterility 2015;103: 1194-1201.e1192.	No relevant outcomes
31	Chen Q, Wang Y, Sun L, Zhang S, Chai W, Hong Q, Long H, Wang L, Lyu Q, Kuang Y. Controlled ovulation of the dominant follicle using progestin in minimal stimulation in poor responders. Reproductive biology and endocrinology : RB&E 2017;15: 71.	No relevant population
32	Chen YH, Wang Q, Zhang YN, Han X, Li DH, Zhang CL. Cumulative live birth and surplus embryo incidence after frozen-thaw cycles in PCOS: how many oocytes do we need? Journal of assisted reproduction and genetics 2017;34: 1153-1159.	No relevant outcomes
33	Cheon KW, Byun HK, Yang KM, Song IO, Choi KH, Yoo KJ. Efficacy of recombinant human follicle-stimulating hormone in improving oocyte quality in assisted reproductive techniques. The Journal of reproductive medicine 2004;49: 733-738.	Full text not found
34	Child TJ, Phillips SJ, Abdul-Jalil AK, Gulekli B, Tan SL. A comparison of in vitro maturation and in vitro fertilization for women with polycystic ovaries. Obstetrics and gynecology 2002;100: 665-670.	No relevant population
35	Choe SA, Kim MJ, Lee HJ, Kim J, Chang EM, Kim JW, Park HM, Lyu SW, Lee WS, Yoon TK et al. Increased proportion of mature oocytes with sustained-release growth hormone treatment in poor responders: a prospective randomized controlled study. Archives of gynecology and obstetrics 2018;297: 791-796.	No relevant outcomes
36	Cobo A, Meseguer M, Remohi J, Pellicer A. Use of cryo-banked oocytes in an ovum donation programme: a prospective, randomized, controlled, clinical trial. Human reproduction (Oxford, England) 2010;25: 2239-2246.	No relevant population

37	Dal Canto MB, Mignini Renzini M, Brambillasca F, Cepparo H, Comi R, Villa A, Rangoni G, Mastrolilli M, Crippa M, de Ponti E et al. IVM--the first choice for IVF in Italy. Reproductive biomedicine online 2006;13: 159-165.	No relevant population
38	Dal Prato L, Borini A, Trevisi MR, Bonu MA, Sereni E, Flamigni C. Effect of reduced dose of triptorelin at the start of ovarian stimulation on the outcome of IVF: a randomized study. Human reproduction (Oxford, England) 2001;16: 1409-1414.	No relevant outcomes
39	Damario MA, Barmat L, Liu HC, Davis OK, Rosenwaks Z. Dual suppression with oral contraceptives and gonadotrophin releasing-hormone agonists improves in-vitro fertilization outcome in high responder patients. Human reproduction (Oxford, England) 1997;12: 2359-2365.	No relevant outcomes
40	Daney de Marcillac F, Pinton A, Guillaume A, Sagot P, Pirrello O, Rongieres C. What are the likely IVF/ICSI outcomes if there is a discrepancy between serum AMH and FSH levels? A multicenter retrospective study. Journal of gynecology obstetrics and human reproduction 2017;46: 629-635.	No relevant population
41	D'Angelo A, Amso NN. Embryo freezing for preventing ovarian hyperstimulation syndrome. Cochrane Database of Systematic Reviews 2007.	No relevant population
42	Dar S, Librach CL, Gunby J, Bissonnette F, Cowan L. Increased risk of preterm birth in singleton pregnancies after blastocyst versus Day 3 embryo transfer: Canadian ART Register (CARTR) analysis. Human reproduction (Oxford, England) 2013;28: 924-928.	No relevant outcomes
43	Dayal MB, Gindoff P, Dubey A, Spitzer TL, Bergin A, Peak D, Frankfurter D. Does ethnicity influence in vitro fertilization (IVF) birth outcomes? Fertility and sterility 2009;91: 2414-2418.	No relevant outcomes
44	De Geyter C, Fehr P, Moffat R, Gruber IM, von Wolff M. Twenty years' experience with the Swiss data registry for assisted reproductive medicine: outcomes, key trends and recommendations for improved practice. Swiss medical weekly 2015;145: w14087.	No relevant outcomes
45	Demirol A, Gurgan T. Comparison of microdose flare-up and antagonist multiple-dose protocols for poor-responder patients: a randomized study. Fertility and sterility 2009;92: 481-485.	No relevant outcomes
46	Dickey RP, Nichols JE, Steinkampf MP, Gocial B, Thornton M, Webster BW, Bello SM, Crain J, Marshall DC. Highly purified human-derived follicle-stimulating hormone (Bravelle) has equivalent efficacy to follitropin-beta (Follistim) in infertile women undergoing in vitro fertilization. Reproductive biology and endocrinology : RB&E 2003;1: 63.	No relevant outcomes
47	Dieamant FC, Petersen CG, Mauri AL, Comar V, Mattila M, Vagnini LD, Renzi A, Petersen B, Nicoletti A, Oliveira JBA et al. Fresh embryos versus freeze-all embryos - transfer strategies: Nuances of a meta-analysis. JBRA assisted reproduction 2017;21: 260-272.	No relevant population
48	Diedrich K, Ludwig M, Felberbaum RE. The role of gonadotropin-releasing hormone antagonists in in vitro fertilization. Seminars in reproductive medicine 2001;19: 213-220.	No relevant outcomes
49	Dolmans MM, Donnez J, Camboni A, Demylle D, Amorim C, Van Langendonckt A, Pirard C. IVF outcome in patients with orthotopically transplanted ovarian tissue. Human reproduction (Oxford, England) 2009;24: 2778-2787.	No relevant population
50	Dong J, Wang Y, Chai WR, Hong QQ, Wang NL, Sun LH, Long H, Wang L, Tian H, Lyu QF et al. 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 : an international journal of obstetrics and gynaecology 2017;124: 1048-1055.	No relevant population
51	Drakopoulos P, Vuong TNL, Ho NAV, Vaiarelli A, Ho MT, Blockeel C, Camus M, Lam AT, van de Vijver A, Humaidan P et al. Corifollitropin alfa followed by highly purified HMG versus recombinant FSH in young poor ovarian responders: a multicentre randomized controlled clinical trial. Human reproduction (Oxford, England) 2017;32: 2225-2233.	No relevant outcomes
52	El-Sheikh MM, Sehly N, Al Mesiry W, Fouad S. Oocytes collected 60 hours after human chorionic gonadotropin administration from patients with polycystic ovary syndrome who underwent limited ovarian stimulation resulted in clinical pregnancies and the delivery of a healthy baby. Fertility and sterility 2005;84: 1758-1761.	No relevant population
53	Ertzeid G, Storeng R, Tanbo T, Dale PO, Bjercke S, Abyholm T. Cycle characteristics of day 3 embryo transfers with 4-cell embryos only. Journal of assisted reproduction and genetics 2003;20: 352-357.	No relevant population
54	Esinler I, Bayar U, Bozdag G, Yarali H. Outcome of intracytoplasmic sperm injection in patients with polycystic ovary syndrome or isolated polycystic ovaries. Fertility and sterility 2005;84: 932-937.	No relevant population
55	Fanchin R, Righini C, Olivennes F, Ferreira AL, de Ziegler D, Frydman R. Consequences of premature progesterone elevation on the outcome of in vitro fertilization: insights into a controversy. Fertility and sterility 1997;68: 799-805.	No relevant population
56	Fasouliotis SJ, Laufer N, Sabbagh-Ehrlich S, Lewin A, Hurwitz A, Simon A. Gonadotropin-releasing hormone (GnRH)-antagonist versus GnRH-agonist in ovarian stimulation of poor responders undergoing IVF. Journal of assisted reproduction and genetics 2003;20: 455-460.	No relevant outcomes
57	Fatemi HM, Blockeel C, Devroey P. Ovarian stimulation: today and tomorrow. Current pharmaceutical biotechnology 2012;13: 392-397.	No relevant outcomes
58	Fatemi HM, Doody K, Griesinger G, Witjes H, Mannaerts B. High ovarian response does not jeopardize ongoing pregnancy rates and increases cumulative pregnancy rates in a GnRH-antagonist protocol. Human reproduction (Oxford, England) 2013;28: 442-452.	No relevant outcomes
59	Ferraretti AP, Gianaroli L, Magli MC, D'Angelo A, Farfalli V, Montanaro N. Exogenous luteinizing hormone in controlled ovarian hyperstimulation for assisted reproduction techniques. Fertility and sterility 2004;82: 1521-1526.	No relevant outcomes
60	Fishel SB, Edwards RG, Purdy JM, Steptoe PC, Webster J, Walters E, Cohen J, Fehilly C, Hewitt J, Rowland G. Implantation, abortion, and birth after in vitro fertilization using the natural menstrual cycle or follicular stimulation with clomiphene citrate and human menopausal gonadotropin. Journal of in vitro fertilization and embryo transfer : IVF 1985;2: 123-131.	No relevant population
61	Gardner DK, Surrey E, Minjarez D, Leitz A, Stevens J, Schoolcraft WB. Single blastocyst transfer: a prospective randomized trial. Fertility and sterility 2004;81: 551-555.	No relevant population
62	Gerris J, De Neubourg D, Mangelschots K, Van Royen E, Van de Meerssche M, Valkenburg M. Prevention of twin pregnancy after in-vitro fertilization or intracytoplasmic sperm injection based on strict embryo criteria: a prospective randomized clinical trial. Human reproduction (Oxford, England) 1999;14: 2581-2587.	No relevant population
63	Gerris J, De Neubourg D, Mangelschots K, Van Royen E, Vercruyssen M, Barudy-Vasquez J, Valkenburg M, Ryckaert G. Elective single day 3 embryo transfer halves the twinning rate without decrease in the ongoing pregnancy rate of an IVF/ICSI programme. Human reproduction (Oxford, England) 2002;17: 2626-2631.	No relevant population

64	Gleicher N, Vega MV, Darmon SK, Weghofer A, Wu YG, Wang Q, Zhang L, Albertini DF, Barad DH, Kushnir VA. Live-birth rates in very poor prognosis patients, who are defined as poor responders under the Bologna criteria, with nonelective single embryo, two-embryo, and three or more embryos transferred. Fertility and sterility 2015;104: 1435-1441.	No relevant outcomes
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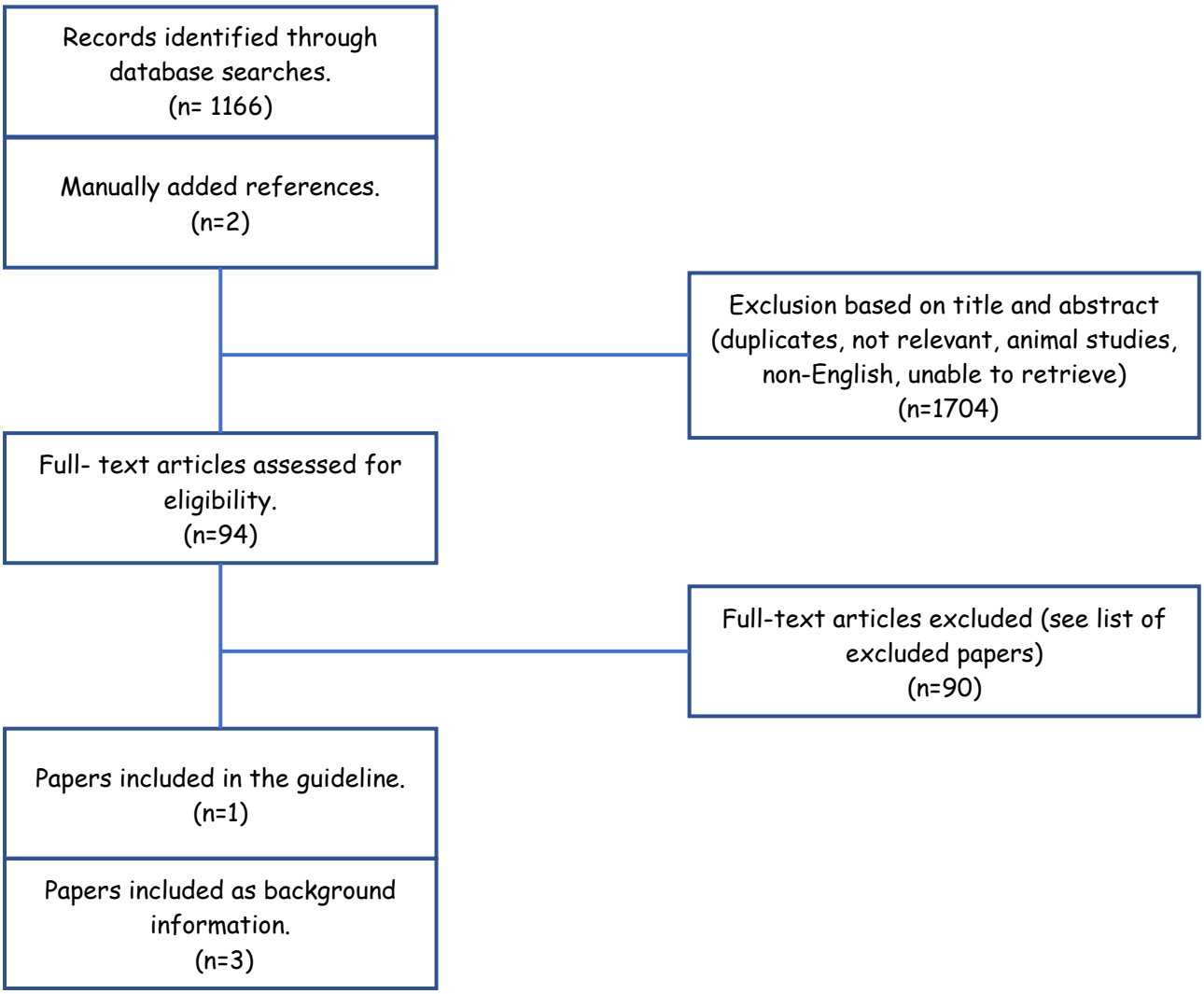
170	Wong KM, van Wely M, Mol F, Repping S, Mastenbroek S. Fresh versus frozen embryo transfers in assisted reproduction. The Cochrane database of systematic reviews 2017;3: Cd011184.	No relevant population
171	Wu K, Zhao H, Liu H, Li M, Ma S, Li C, Liu C, Chen ZJ. Day 3 ET, single blastocyst transfer (SBT) or frozen-thawed embryo transfer (FET): which is preferable for high responder patients in IVF/ICSI cycles? Journal of assisted reproduction and genetics 2014;31: 275-278.	No relevant population
172	Wu KL, Zhao HB, Liu H, Zhong WX, Yu GL, Chen ZJ. Elective single blastocyst transfer is more suitable for normal responders than for high responders. Chinese medical journal 2013;126: 2125-2128.	No relevant population
173	Wunder D, Neurohr EM, Faouzi M, Birkhauser MH. Origin and outcome of multiple pregnancies in Bern, Switzerland, 1995-2006 and the current proposal of the Swiss parliament to revise the Swiss law of reproductive medicine: Switzerland quo vadis? Swiss medical weekly 2013;143: w13864.	No relevant outcomes
174	Xiao JS, Su CM, Zeng XT. 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: e106854.	No relevant outcomes
175	Xin ZM, Xu B, Jin HX, Song WY, Sun YP. Day 3 embryo transfer may have better pregnancy outcomes in younger than 35-year-old patients with poor ovarian response. Journal of assisted reproduction and genetics 2012;29: 1077-1081.	No relevant outcomes
176	Yakin K, Oktem O, Balaban B, Urman B. Bologna criteria are predictive for ovarian response and live birth in subsequent ovarian stimulation cycles. Archives of gynecology and obstetrics 2019;299: 571-577.	No relevant population
177	Yang R, Yang S, Li R, Chen X, Wang H, Ma C, Liu P, Qiao J. Biochemical pregnancy and spontaneous abortion in first IVF cycles are negative predictors for subsequent cycles: an over 10,000 cases cohort study. Archives of gynecology and obstetrics 2015;292: 453-458.	No relevant outcomes
178	Yates AP, Rustamov O, Roberts SA, Lim HY, Pemberton PW, Smith A, Nardo LG. Anti-Mullerian hormone-tailored stimulation protocols improve outcomes whilst reducing adverse effects and costs of IVF. Human reproduction (Oxford, England) 2011;26: 2353-2362.	No relevant outcomes
179	Yovich JL, Alsbjerg B, Conceicao JL, Hinchliffe PM, Keane KN. PIVET rFSH dosing algorithms for individualized controlled ovarian stimulation enables optimized pregnancy productivity rates and avoidance of ovarian hyperstimulation syndrome. Drug design, development and therapy 2016;10: 2561-2573.	No relevant outcomes
180	Zech J, Brandao A, Zech M, Lugger K, Neururer S, Ulmer H, Ruttmann-Ulmer E. Elective frozen-thawed embryo transfer (FET) in women at risk for ovarian hyperstimulation syndrome. Reproductive biology 2018;18: 46-52.	No relevant population
181	Zhang J. Resurgence of Minimal Stimulation In Vitro Fertilization with A Protocol Consisting of Gonadotropin Releasing Hormone-Agonist Trigger and Vitrified-Thawed Embryo Transfer. International journal of fertility & sterility 2016;10: 148-153.	No relevant outcomes
182	Zhang JJ, Merhi Z, Yang M, Bodri D, Chavez-Badiola A, Repping S, van Wely M. Minimal stimulation IVF vs conventional IVF: a randomized controlled trial. American journal of obstetrics and gynecology 2016;214: 96.e91-98.	No relevant population
183	Zhang HJ, Song XR, Lu R, Xue FX. Modified super-long down-regulation protocol improves fertilization and pregnancy in patients with poor ovarian responses. Chinese medical journal 2012;125: 2837-2840.	No relevant outcomes
184	Zhang JJ, Yang M, Merhi Z. Reproductive potential of mature oocytes after conventional ovarian hyperstimulation for in vitro fertilization. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics 2016;133: 230-233.	No relevant population
185	Zhu Q, Chen Q, Wang L, Lu X, Lyu Q, Wang Y, Kuang Y. Live birth rates in the first complete IVF cycle among 20 687 women using a freeze-all strategy. Human reproduction (Oxford, England) 2018;33: 924-929.	No relevant outcomes

PICO 10. In a fresh cycle, should endometrial criteria be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART? If yes, what is the appropriate cut off?

Search strings

PUBMED	("Endometrium"[Mesh] OR "Endometri* thickness" OR "endometri* pattern" OR "endometri* contractility" OR "endometri* volume" OR "pinopodes" OR "uterine contraction" OR "endometri* development" OR "endometri* preparation" OR "Endometri* receptivity" OR "triple-line endometrium" OR "endometrial priming" OR "endometri* vascularity" OR "thin endometrium" OR "endometri* implantation" OR "Window of implantation" OR WOI) AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy" OR "fresh cycle") AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	("Endometrium" OR "Endometri* thickness" OR "endometri* pattern" OR "endometri* contractility" OR "endometri* volume" OR "endometri* preparation" OR "Endometri* receptivity" OR "thin endometrium" OR "endometri* implantation" OR "Window of implantation") AND ("Single Embryo Transfer" AND "Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer") AND ("Live Birth" OR LBR OR "Multiple pregnancy " OR " multiple birth" OR "premature " OR prematurity OR "preterm infant" OR "Maternal Death" OR "maternal morbidity" OR "Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death")

Flowchart



List of excluded studies

Nr	References	
1	Aksoy S, Yakin K, Seyhan A, Oktem O, Alatas C, Ata B, Urman B. Does the use of gonadotropin-releasing hormone antagonists in natural IVF cycles for poor responder patients cause more harm than benefit? Human fertility (Cambridge, England) 2016;19: 97-101.	Relevant patients and intervention are not included
2	Al Chami A, Saridogan E. Endometrial Polyps and Subfertility. Journal of obstetrics and gynaecology of india 2017;67: 9-14.	Relevant intervention is not included
3	Andersen AN, Devroey P, Arce JC. Clinical outcome following stimulation with highly purified hMG or recombinant FSH in patients undergoing IVF: a randomized assessor-blind controlled trial. Human reproduction (Oxford, England) 2006;21: 3217-3227.	Relevant intervention is not included
4	Antinori S, Versaci C, Gholami GH, Panci C, Caffa B. Oocyte donation in menopausal women. Human reproduction (Oxford, England) 1993;8: 1487-1490.	Relevant intervention is not included
5	Bassil S. Changes in endometrial thickness, width, length and pattern in predicting pregnancy outcome during ovarian stimulation in in vitro fertilization. Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology 2001;18: 258-263.	Relevant intervention is not included
6	Bergh C, Hillensjo T, Nilsson L. Sonographic evaluation of the endometrium in in vitro fertilization IVF cycles. A way to predict pregnancy? Acta obstetricia et gynecologica Scandinavica 1992;71: 624-628.	Relevant intervention is not included
7	Bourdon M, Santulli P, Gayet V, Maignien C, Marcellin L, Pocate-Cheriet K, Chapron C. Assisted reproduction technique outcomes for fresh versus deferred cryopreserved day-2 embryo transfer: a retrospective matched cohort study. Reproductive biomedicine online 2017;34: 248-257.	Relevant patients and intervention are not included
8	Bourdon M, Santulli P, Maignien C, Gayet V, Pocate-Cheriet K, Marcellin L, Chapron C. The deferred embryo transfer strategy improves cumulative pregnancy rates in endometriosis-related infertility: A retrospective matched cohort study. PloS one 2018;13: e0194800.	Relevant patients and intervention is not included
9	Bourgain C, Devroey P. The endometrium in stimulated cycles for IVF. Human reproduction update 2003;9: 515-522.	Relevant intervention is not included
10	Bourgain C, Ubaldi F, Tavaniotou A, Smitz J, Van Steirteghem AC, Devroey P. Endometrial hormone receptors and proliferation index in the periovulatory phase of stimulated embryo transfer cycles in comparison with natural cycles and relation to clinical pregnancy outcome. Fertility and sterility 2002;78: 237-244.	Relevant intervention is not included
11	Bracewell-Milnes T, Saso S, Abdalla H, Nikolau D, Norman-Taylor J, Johnson M, Holmes E, Thum MY. Metabolomics as a tool to identify biomarkers to predict and improve outcomes in reproductive medicine: a systematic review. Human reproduction update 2017;23: 723-736.	Relevant intervention is not included
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13	Chai J, Yeung TW, Lee VC, Li RH, Lau EY, Yeung WS, Ho PC, Ng EH. Live birth rate, multiple pregnancy rate, and obstetric outcomes of elective single and double embryo transfers: Hong Kong experience. Hong Kong medical journal = Xianggang yi xue za zhi 2014;20: 102-106.	Relevant patients are not included (free PDF found online)
14	Check JH, Askari HA, Fisher C, Vanaman L. The use of a shared donor oocyte program to evaluate the effect of uterine senescence. Fertility and sterility 1994;61: 252-256.	Relevant patients are not included
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16	Dain L, Bider D, Levron J, Zinchenko V, Westler S, Dirnfeld M. Thin endometrium in donor oocyte recipients: enigma or obstacle for implantation? Fertility and sterility 2013;100: 1289-1295.	Relevant intervention is not included
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20	Eldar-Geva T, Meagher S, Healy DL, MacLachlan V, Breheny S, Wood C. Effect of intramural, subserosal, and submucosal uterine fibroids on the outcome of assisted reproductive technology treatment. Fertility and sterility 1998;70: 687-691.	Relevant intervention is not included
21	El-Toukhy T, Coomarasamy A, Khairy M, Sunkara K, Seed P, Khalaf Y, Braude P. The relationship between endometrial thickness and outcome of medicated frozen embryo replacement cycles. Fertility and sterility 2008;89: 832-839.	Relevant intervention is not included

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24	Gingold JA, Lee JA, Rodriguez-Purata J, Whitehouse MC, Sandler B, Grunfeld L, Mukherjee T, Copperman AB. Endometrial pattern, but not endometrial thickness, affects implantation rates in euploid embryo transfers. Fertility and sterility 2015;104: 620-628.e625.	Relevant intervention is not included
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28	Hart R, Khalaf Y, Yeong CT, Seed P, Taylor A, Braude P. A prospective controlled study of the effect of intramural uterine fibroids on the outcome of assisted conception. Human reproduction (Oxford, England) 2001;16: 2411-2417.	Relevant patients and intervention are not included
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35	Ko JK, Ng EH. Scratching and IVF: any role? Current opinion in obstetrics & gynecology 2016;28: 178-183.	Relevant patients and intervention are not included
36	Koot YE, Macklon NS. Embryo implantation: biology, evaluation, and enhancement. Current opinion in obstetrics & gynecology 2013;25: 274-279.	Relevant intervention is not included
37	Laasch C, Puscheck E. Cumulative embryo score, not endometrial thickness, is best for pregnancy prediction in IVF. Journal of assisted reproduction and genetics 2004;21: 47-50.	Relevant intervention is not included (CES used instead)
38	Lamanna G, Scioscia M, Lorusso F, Serrati G, Selvaggi LE, Depalo R. Parabolic trend in endometrial thickness at embryo transfer in in vitro fertilization/intracytoplasmic sperm injection cases with clinical pregnancy evidence. Fertility and sterility 2008;90: 1272-1274.	Relevant intervention is not included
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47	Molina A, Sanchez J, Sanchez W, Vielma V. Platelet-rich plasma as an adjuvant in the endometrial preparation of patients with refractory endometrium. JBRA assisted reproduction 2018;22: 42-48.	Relevant intervention is not included
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52	Ng EH, Chan CC, Tang OS, Yeung WS, Ho PC. Endometrial and subendometrial vascularity is higher in pregnant patients with livebirth following ART than in those who suffer a miscarriage. Human reproduction (Oxford, England) 2007;22: 1134-1141.	Relevant patients and intervention are not included
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82	Xu Z, Meng L, Pan C, Chen X, Huang X, Yang H. Does oral contraceptives pretreatment affect the pregnancy outcome in polycystic ovary syndrome women undergoing ART with GnRH agonist protocol? Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2019;35: 124-127.	Relevant intervention is not included
83	Yaman C, Ebner T, Sommergruber M, Polz W, Tews G. Role of three-dimensional ultrasonographic measurement of endometrium volume as a predictor of pregnancy outcome in an IVF-ET program: a preliminary study. Fertility and sterility 2000;74: 797-801.	Relevant intervention is not included
84	Yang W, Zhang T, Li Z, Ren X, Huang B, Zhu G, 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 2018;97: e9577.	Relevant patients are not included
85	Youm HS, Choi YS, Han HD. In vitro fertilization and embryo transfer outcomes in relation to myometrial thickness. Journal of assisted reproduction and genetics 2011;28: 1135-1140.	Relevant patients are not included
86	Yuan X, Saravelos SH, Wang Q, Xu Y, Li TC, Zhou C. Endometrial thickness as a predictor of pregnancy outcomes in 10787 fresh IVF-ICSI cycles. Reproductive biomedicine online 2016;33: 197-205.	Relevant intervention is not included
87	Zhai XH, Zhang P, Wu FX, Wang AC, Liu PS. GnRH antagonist for patients with polycystic ovary syndrome undergoing controlled ovarian hyperstimulation for in vitro fertilization and embryo transfer in fresh cycles. Experimental and therapeutic medicine 2017;13: 3097-3102.	Relevant intervention is not included

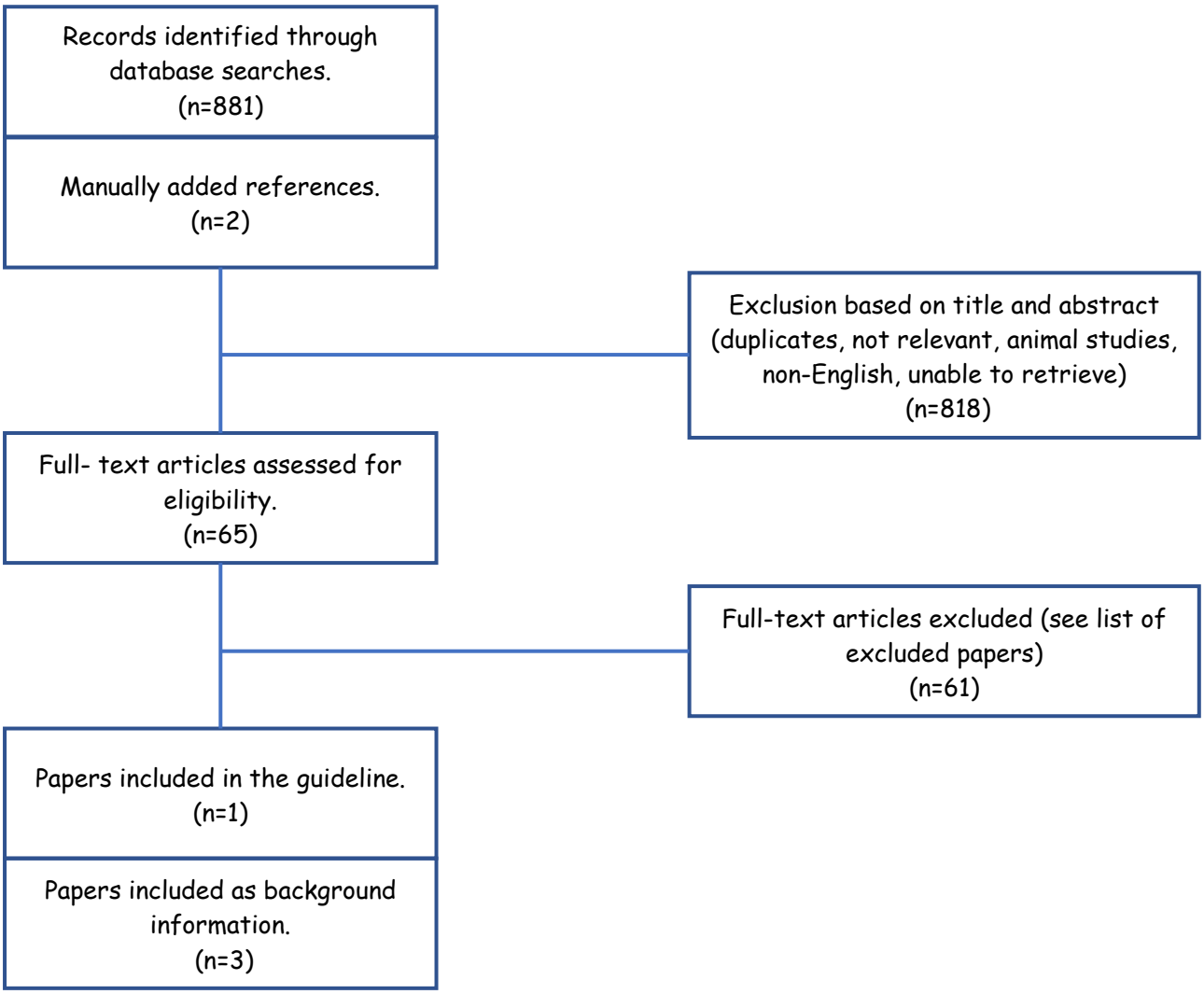
88	Zhao J, Zhang Q, Li Y. The effect of endometrial thickness and pattern measured by ultrasonography on pregnancy outcomes during IVF-ET cycles. Reproductive biology and endocrinology : RB&E 2012;10: 100.	Relevant intervention is not included
89	Zhao J, Zhang Q, Wang Y, Li Y. Endometrial pattern, thickness and growth in predicting pregnancy outcome following 3319 IVF cycle. Reproductive biomedicine online 2014;29: 291-298.	Relevant intervention is not included
90	Zheng Y, Dong X, Wang R, Yang W, Zhang H, Zhu G, Ai J. The criteria for optimal down-regulation with gonadotropin-releasing hormone-agonist: a retrospective cohort study. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2015;31: 959-965.	Relevant intervention is not included

PICO 11. In FET, should endometrial characteristics be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART (with own gametes or with donated oocytes/embryos) (hormonal substitution vs. ovulatory cycle)? If yes, what is the appropriate cut off?

Search strings

PUBMED	("Endometrium"[Mesh] OR "Endometri* thickness" OR "endometri* pattern" OR "endometri* contractility" OR "endometri* volume" OR "pinopodes" OR "uterine contraction" OR "endometri* development" OR "endometri* preparation" OR "Endometri* receptivity" OR "triple-line endometrium" OR "endometrial priming" OR "endometri* vascularity" OR "thin endometrium" OR "endometri* implantation" OR "Window of implantation" OR WOI) AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy" OR "fresh cycle") AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	("Endometrium" OR "Endometri* thickness" OR "endometri* pattern" OR "endometri* contractility" OR "endometri* volume" OR "endometri* preparation" OR "Endometri* receptivity" OR "thin endometrium" OR "endometri* implantation" OR "Window of implantation") AND ("Single Embryo Transfer" AND "Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer") AND ("Live Birth" OR LBR OR "Multiple pregnancy " OR " multiple birth" OR "premature " OR prematurity OR "preterm infant" OR "Maternal Death" OR "maternal morbidity" OR "Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death")

Flowchart



List of excluded studies

Check the December draft for exclusion of updated studies

Nr	References	Exclusion criteria
1	Agha-Hosseini M, Hashemi L, Aleyasin A, Ghasemi M, Sarvi F, Nashtaei MS, Khodarahmian M. Natural cycle versus artificial cycle in frozen-Thawed embryo transfer: a randomized prospective trial. Turk jinekoloji ve obstetrik dernegi dergisi 2018;15: 12-17.	Relevant intervention is not included
2	Alur-Gupta S, Hopeman M, Berger DS, Gracia C, Barnhart KT, Coutifaris C, Senapati S. Impact of method of endometrial preparation for frozen blastocyst transfer on pregnancy outcome: a retrospective cohort study. Fertility and sterility 2018;110: 680-686.	Relevant intervention is not included
3	Chang EM, Han JE, Kim YS, Lyu SW, Lee WS, Yoon TK. Use of the natural cycle and vitrification thawed blastocyst transfer results in better in-vitro fertilization outcomes : cycle regimens of vitrification thawed blastocyst transfer. Journal of assisted reproduction and genetics 2011;28: 369-374.	Relevant intervention is not included
4	Dain L, Bider D, Levron J, Zinchenko V, Westler S, Dirnfeld M. Thin endometrium in donor oocyte recipients: enigma or obstacle for implantation? Fertility and sterility 2013;100: 1289-1295.	Relevant intervention is not included
5	Diaz I, Navarro J, Blasco L, Simon C, Pellicer A, Remohi J. Impact of stage III-IV endometriosis on recipients of sibling oocytes: matched case-control study. Fertility and sterility 2000;74: 31-34.	Relevant patients and intervention is not included
6	Diaz-Gimeno P, Ruiz-Alonso M, Sebastian-Leon P, Pellicer A, Valbuena D, Simon C. Window of implantation transcriptomic stratification reveals different endometrial subsignatures associated with live birth and biochemical pregnancy. Fertility and sterility 2017;108: 703-710.e703.	Relevant intervention is not included
7	El-Toukhy T, Wharf E, Walavalkar R, Singh A, Bolton V, Khalaf Y, Braude P. Delayed blastocyst development does not influence the outcome of frozen-thawed transfer cycles. BJOG : an international journal of obstetrics and gynaecology 2011;118: 1551-1556.	Relevant intervention is not included

8	Evans J, Hannan NJ, Edgell TA, Vollenhoven BJ, Lutjen PJ, Osianlis T, Salamonsen LA, Rombauts LJF. Fresh versus frozen embryo transfer: backing clinical decisions with scientific and clinical evidence. Human reproduction update 2014;20: 808-821.	Relevant patients and intervention is not included
9	Fang C, Yue CM, Huang R, Wei LN, Jia L. Pregnancy outcomes of blastocysts cultured overnight after thawing. Archives of gynecology and obstetrics 2016;293: 1347-1356.	Relevant patients and intervention is not included
10	Gallos ID, Khairy M, Chu J, Rajkhowa M, Tobias A, Campbell A, Dowell K, Fishel S, Coomarasamy A. Optimal endometrial thickness to maximize live births and minimize pregnancy losses: Analysis of 25,767 fresh embryo transfers. Reproductive biomedicine online 2018;37: 542-548.	Relevant intervention is not included
11	Ghobara T, Gelbaya TA, Ayeleke RO. Cycle regimens for frozen-thawed embryo transfer. Cochrane Database of Systematic Reviews 2017.	Relevant intervention is not included
12	Groenewoud ER, Cantineau AEP, Kollen BJ, Macklon NS, Cohlen BJ. What is the optimal means of preparing the endometrium in frozen-thawed embryo transfer cycles? A systematic review and meta-analysis. Human reproduction update 2013;19: 458-470.	Relevant patients and intervention is not included
13	Groenewoud ER, Cohlen BJ, Al-Oraiby A, Brinkhuis EA, Broekmans FJ, de Bruin JP, van den Dool G, Fleisher K, Friederich J, Goddijn M et al. A randomized controlled, non-inferiority trial of modified natural versus artificial cycle for cryo-thawed embryo transfer. Human reproduction (Oxford, England) 2016;31: 1483-1492.	Relevant intervention is not included
14	Groenewoud ER, Cohlen BJ, Al-Oraiby A, Brinkhuis EA, Broekmans FJM, de Bruin J-P, van Dool G, Fleisher K, Friederich J, Goddijn M et al. Influence of endometrial thickness on pregnancy rates in modified natural cycle frozen-thawed embryo transfer. Acta obstetricia et gynecologica Scandinavica 2018;97: 808-815.	Relevant intervention is not included
15	Guan Y, Fan H, Styer AK, Xiao Z, Li Z, Zhang J, Sun L, Wang X, Zhang Z. A modified natural cycle results in higher live birth rate in vitrified-thawed embryo transfer for women with regular menstruation. Systems biology in reproductive medicine 2016;62: 335-342.	Relevant intervention is not included
16	Guo H, Wang Y, Chen Q, Chai W, Lv Q, Kuang Y. Effect of Natural Cycle Endometrial Preparation for Frozen-Thawed Embryo Transfer in Patients with Advanced Endometriosis. Medical science monitor : international medical journal of experimental and clinical research 2016;22: 4596-4603.	Relevant intervention is not included
17	Hasson J, Tulandi T, Son WY, Al Ma'mari N, Badeghiesh A, Tannus S, Takefman J, Shavit T. Reproductive outcomes of familial oocyte donation. Fertility and sterility 2016;106: 1696-1702.	Relevant intervention is not included
18	Hatoum I, Bellon L, Swierkowski N, Ouazana M, Bouba S, Fathallah K, Paillusson B, Bailly M, Boitrelle F, Alter L et al. Disparities in reproductive outcomes according to the endometrial preparation protocol in frozen embryo transfer : The risk of early pregnancy loss in frozen embryo transfer cycles. Journal of assisted reproduction and genetics 2018;35: 425-429.	Relevant patients and intervention is not included
19	Ke H, Jiang J, Xia M, Tang R, Qin Y, Chen Z-J. The Effect of Tamoxifen on Thin Endometrium in Patients Undergoing Frozen-Thawed Embryo Transfer. Reproductive sciences (Thousand Oaks, Calif) 2018;25: 861-866.	Relevant patients and intervention is not included
20	Ko JK, Ng EH. Scratching and IVF: any role? Current opinion in obstetrics & gynecology 2016;28: 178-183.	Relevant patients and intervention is not included
21	Kofinas JD, Mehr H, Ganguly N, Biley Y, Bochkovsky S, McCulloh D, Grifo J. Is it the egg or the endometrium? Elevated progesterone on day of trigger is not associated with embryo ploidy nor decreased success rates in subsequent embryo transfer cycles. Journal of assisted reproduction and genetics 2016;33: 1169-1174.	Relevant patients and intervention is not included
22	Konc J, Kanyo K, Varga E, Kriston R, Cseh S. The effect of cycle regimen used for endometrium preparation on the outcome of day 3 frozen embryo transfer cycle. Fertility and sterility 2010;94: 767-768.	Relevant patients and intervention is not included
23	Kunicki M, Łukaszuk K, Liss J, Skowrońska P, Szczyptańska J. Granulocyte colony stimulating factor treatment of resistant thin endometrium in women with frozen-thawed blastocyst transfer. Systems biology in reproductive medicine 2017;63: 49-57.	Relevant intervention is not included
24	Kyrou D, Fatemi HM, Blockeel C, Stoop D, Albuarki H, Verheyen G, Devroey P. Transfer of cryopreserved - thawed embryos in hCG induced natural or clomiphene citrate cycles yields similar live birth rates in normo-ovulatory women. Journal of assisted reproduction and genetics 2010;27: 683-689.	Relevant intervention is not included
25	Law TSM, Cheung WC, Wu F, Zhang R, Chung JPW, Wang CC, Chen X, Li TC. Endometrial Vascularization Characterized by Optical Coherence Tomography and Immunohistochemistry in Women Undergoing In Vitro Fertilization-Embryo Transfer Treatment. Medicina (Kaunas, Lithuania) 2019;55: 81.	Relevant intervention is not included
26	Li S, Wang J, Cheng Y, Zhou D, Yin T, Xu W, Yu N, Yang J. Intrauterine administration of hCG-activated autologous human peripheral blood mononuclear cells (PBMC) promotes live birth rates in frozen/thawed embryo transfer cycles of patients with repeated implantation failure. Journal of reproductive immunology 2017;119: 15-22.	Relevant intervention is not included
27	Liu J, Zheng J, Lei YL, Wen XF. Effects of endometrial preparations and transferred embryo types on pregnancy outcome from patients with advanced maternal age. Systems biology in reproductive medicine 2019;65: 181-186.	Relevant intervention is not included
28	Liu KE, Hartman M, Hartman A, Luo ZC, Mahutte N. The impact of a thin endometrial lining on fresh and frozen-thaw IVF outcomes: an analysis of over 40 000 embryo transfers. Human reproduction (Oxford, England) 2018;33: 1883-1888.	Relevant patients and intervention is not included
29	Molina A, Sánchez J, Sánchez W, Vielma V. Platelet-rich plasma as an adjuvant in the endometrial preparation of patients with refractory endometrium. JBRA assisted reproduction 2018;22: 42-48.	Relevant intervention is not included
30	Montoya-Botero P, Polyzos NP. The endometrium during and after ovarian hyperstimulation and the role of segmentation of infertility treatment. Best practice & research Clinical endocrinology & metabolism 2019;33: 61-75.	Relevant intervention is not included

31	Moreno I, Codoñer FM, Vilella F, Valbuena D, Martinez-Blanch JF, Jimenez-Almazán J, Alonso R, Alamá P, Remohí J, Pellicer A et al. Evidence that the endometrial microbiota has an effect on implantation success or failure. American journal of obstetrics and gynecology 2016;215: 684-703.	Relevant intervention is not included
32	Munch EM, Sparks AE, Zimmerman MB, Van Voorhis BJ, Duran EH. High FSH dosing is associated with reduced live birth rate in fresh but not subsequent frozen embryo transfers. Human reproduction (Oxford, England) 2017;32: 1402-1409.	Relevant patients and intervention is not included
33	Nerenz RD. Omics in Reproductive Medicine: Application of Novel Technologies to Improve the IVF Success Rate. Advances in clinical chemistry 2016;76: 55-95.	Relevant intervention is not included
34	Ng EHY, Chan CCW, Tang OS, Yeung WSB, Ho PC. Endometrial and subendometrial vascularity is higher in pregnant patients with livebirth following ART than in those who suffer a miscarriage. Human reproduction (Oxford, England) 2007;22: 1134-1141.	Relevant intervention is not included
35	Noyes N, Hampton BS, Berkeley A, Licciardi F, Grifo J, Krey L. Factors useful in predicting the success of oocyte donation: a 3-year retrospective analysis. Fertility and sterility 2001;76: 92-97.	Relevant intervention is not included
36	Ozgur K, Bulut H, Berkkanoglu M, Basegmez FO, Coetzee K. Six-month recovery needed after dilation and curettage (D and C) for reproductive outcomes in frozen embryo transfer. Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology 2018;38: 1150-1157.	Relevant intervention is not included
37	Papanikolaou EG, Kyrou D, Zervakakou G, Paggou E, Humaidan P. "Follicular HCG endometrium priming for IVF patients experiencing resisting thin endometrium. A proof of concept study". Journal of assisted reproduction and genetics 2013;30: 1341-1345.	Relevant intervention is not included
38	Peeraer K, Couck I, Debrock S, De Neubourg D, De Loecker P, Tomassetti C, Laenen A, Welkenhuysen M, Meeuwis L, Pelckmans S et al. Frozen-thawed embryo transfer in a natural or mildly hormonally stimulated cycle in women with regular ovulatory cycles: a RCT. Human reproduction (Oxford, England) 2015;30: 2552-2562.	Relevant intervention is not included
39	Reljic M, Knez J. Predicted luteal phase length has no influence on success of vitrified-warmed blastocyst transfer in natural cycle. Journal of ovarian research 2018;11: 63.	Relevant patients and intervention is not included
40	Roberts SA, Hann M, Brison DR. Factors affecting embryo viability and uterine receptivity: insights from an analysis of the UK registry data. Reproductive biomedicine online 2016;32: 197-206.	Relevant patients and intervention is not included
41	Roque M, Lattes K, Serra S, Solà I, Geber S, Carreras R, Checa MA. Fresh embryo transfer versus frozen embryo transfer in in vitro fertilization cycles: a systematic review and meta-analysis. Fertility and sterility 2013;99: 156-162.	Relevant patients and intervention is not included
42	Shapiro BS, Daneshmand ST, Garner FC, Aguirre M, Hudson C. Clinical rationale for cryopreservation of entire embryo cohorts in lieu of fresh transfer. Fertility and sterility 2014;102: 3-9.	Relevant patients and intervention is not included
43	Shi Y, Wei D, Liang X, Sun Y, Liu J, Cao Y, Zhang B, Legro RS, Zhang H, Chen ZJ. Live birth after fresh embryo transfer vs elective embryo cryopreservation/frozen embryo transfer in women with polycystic ovary syndrome undergoing IVF (FreFro-PCOS): study protocol for a multicenter, prospective, randomized controlled clinical trial. Trials 2014;15.	This is a study protocol - however, the study itself does not present the intervention either
44	Singh B, Reschke L, Segars J, Baker VL. Frozen-thawed embryo transfer: the potential importance of the corpus luteum in preventing obstetrical complications. Fertility and sterility 2020;113: 252-257.	Relevant patients and intervention is not included
45	Stadtmauer L, Harrison DD, Boyd J, Bocca S, Oehninger S. Pilot study evaluating a progesterone vaginal ring for luteal-phase replacement in donor oocyte recipients. Fertility and sterility 2009;92: 1600-1605.	Relevant patients and intervention is not included
46	Sudoma I, Goncharova Y, Zukin V. Optimization of cryocycles by using pinopode detection in patients with multiple implantation failure: preliminary report. Reproductive biomedicine online 2011;22: 590-596.	Relevant intervention is not included
47	van de Vijver A, Polyzos NP, Van Landuyt L, De Vos M, Camus M, Stoop D, Tournaye H, Blockeel C. Cryopreserved embryo transfer in an artificial cycle: is GnRH agonist down-regulation necessary? Reproductive biomedicine online 2014;29: 588-594.	Relevant intervention is not included
48	van de Vijver A, Polyzos NP, Van Landuyt L, Mackens S, Stoop D, Camus M, De Vos M, Tournaye H, Blockeel C. What is the optimal duration of progesterone administration before transferring a vitrified-warmed cleavage stage embryo? A randomized controlled trial. Human reproduction (Oxford, England) 2016;31: 1097-1104.	Relevant patients and intervention is not included
49	Vuong LN, Pham TD, Dang VQ, Ho TM, Ho VNA, Norman RJ, Mol BW. Live birth rates with a freeze-only strategy versus fresh embryo transfer: secondary analysis of a randomized clinical trial. Reproductive biomedicine online 2019;38: 387-396.	Relevant intervention is not included
50	Wang W, Ren L, Wei D, Shen Y, Liu B, Wang X, Chen F, Li M, Yan L, Feng Z et al. Effect of maternal and embryonic factors on frozen-thawed IVF-ET outcome after pre-equilibration with hyaluronan. Archives of gynecology and obstetrics 2019;299: 247-258.	Relevant patients and intervention is not included
51	Wang Y, Zhu Y, Sun Y, Di W, Qiu M, Kuang Y, Shen H. Ideal embryo transfer position and endometrial thickness in IVF embryo transfer treatment. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics 2018;143: 282-288.	Relevant intervention is not included

52	Wong KM, van Wely M, Mol F, Repping S, Mastenbroek S. Fresh versus frozen embryo transfers in assisted reproduction. Cochrane Database of Systematic Reviews 2017.	Relevant patients and intervention is not included
53	Xu B, Zhang Q, Hao J, Xu D, Li Y. Two protocols to treat thin endometrium with granulocyte colony-stimulating factor during frozen embryo transfer cycles. Reproductive biomedicine online 2015;30: 349-358.	Relevant intervention is not included
54	Xue-Mei W, Hong J, Wen-Xiang Z, Yang L. The effects of growth hormone on clinical outcomes after frozen-thawed embryo transfer. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics 2016;133: 347-350.	Relevant patients and intervention is not included
55	Yang W, Zhang T, Li Z, Ren X, Huang B, Zhu G, 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 2018;97: e9577-e9577.	Relevant patients are not included
56	Yarali H, Polat M, Mumusoglu S, Yarali I, Bozdag G. Preparation of endometrium for frozen embryo replacement cycles: a systematic review and meta-analysis. Journal of assisted reproduction and genetics 2016;33: 1287-1304.	Relevant intervention is not included
57	Yu J, Ma Y, Wu Z, Li Y, Tang L, Li Y, Deng B. Endometrial preparation protocol of the frozen-thawed embryo transfer in patients with polycystic ovary syndrome. Archives of gynecology and obstetrics 2015;291: 201-211.	Relevant intervention is not included
58	Zhang J, Liu H, Mao X, Chen Q, Fan Y, Xiao Y, Wang Y, Kuang Y. Effect of body mass index on pregnancy outcomes in a freeze-all policy: an analysis of 22,043 first autologous frozen-thawed embryo transfer cycles in China. BMC medicine 2019;17: 114-114.	Relevant intervention is not included
59	Zhang J, Liu H, Wang Y, Mao X, Chen Q, Fan Y, Xiao Y, Kuang Y. Letrozole use during frozen embryo transfer cycles in women with polycystic ovary syndrome. Fertility and sterility 2019;112: 371-377.	Relevant intervention is not included
60	Zhang T, Li Z, Ren X, Huang B, Zhu G, Yang W, 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 2018;97: e9689.	Relevant intervention is not included
61	Zheng Y, Dong X, Wang R, Yang W, Zhang H, Zhu G, Ai J. The criteria for optimal down-regulation with gonadotropin-releasing hormone-agonist: a retrospective cohort study. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2015;31: 959-965.	Relevant patients and intervention is not included

PICO 12. Should a different embryo transfer strategy be applied for patients undergoing ART with donor oocytes and donated embryos?

Search strings

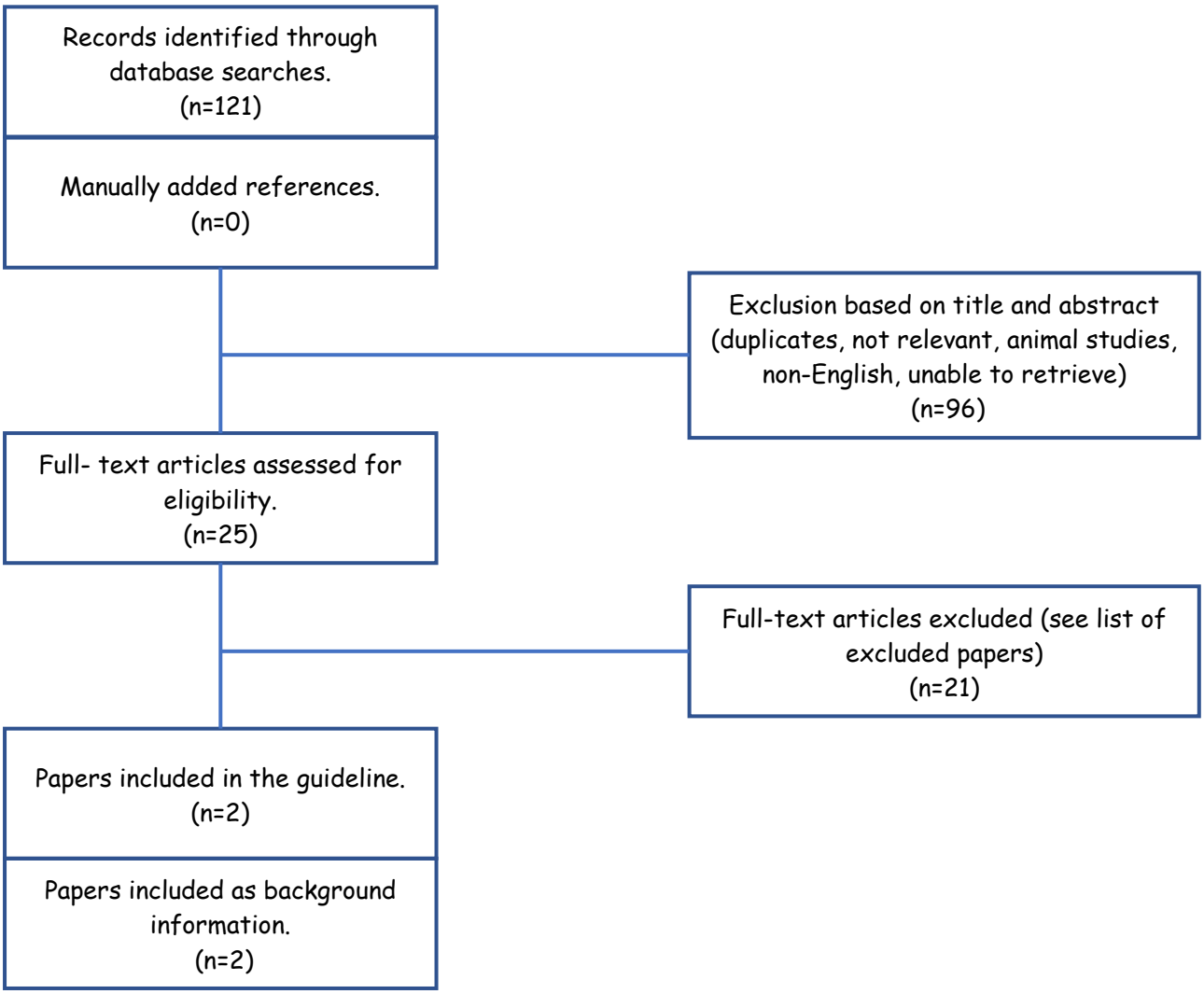
The literature search for this PICO was included in the literature searches conducted for the other PICOs considering the respective population undergoing autologous and donor cycles.

PICO 13. Should a different embryo transfer strategy be applied for gestational carriers?

Search strings

PUBMED	("Surrogate Mothers"[Mesh] OR Surrogacy OR " surrogate mother" OR surrogate OR "gestational carrier") AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy" OR "frozen cycle") AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	"Surrogate Mother" OR "gestational carrier") AND ("Embryo Transfer" OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer") AND ("Live Birth" OR LBR OR "Multiple pregnancy " OR " multiple birth" OR "premature " OR prematurity OR "preterm infant" OR "Maternal Death" OR "maternal morbidity" OR "Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death")

Flowchart



List of excluded studies

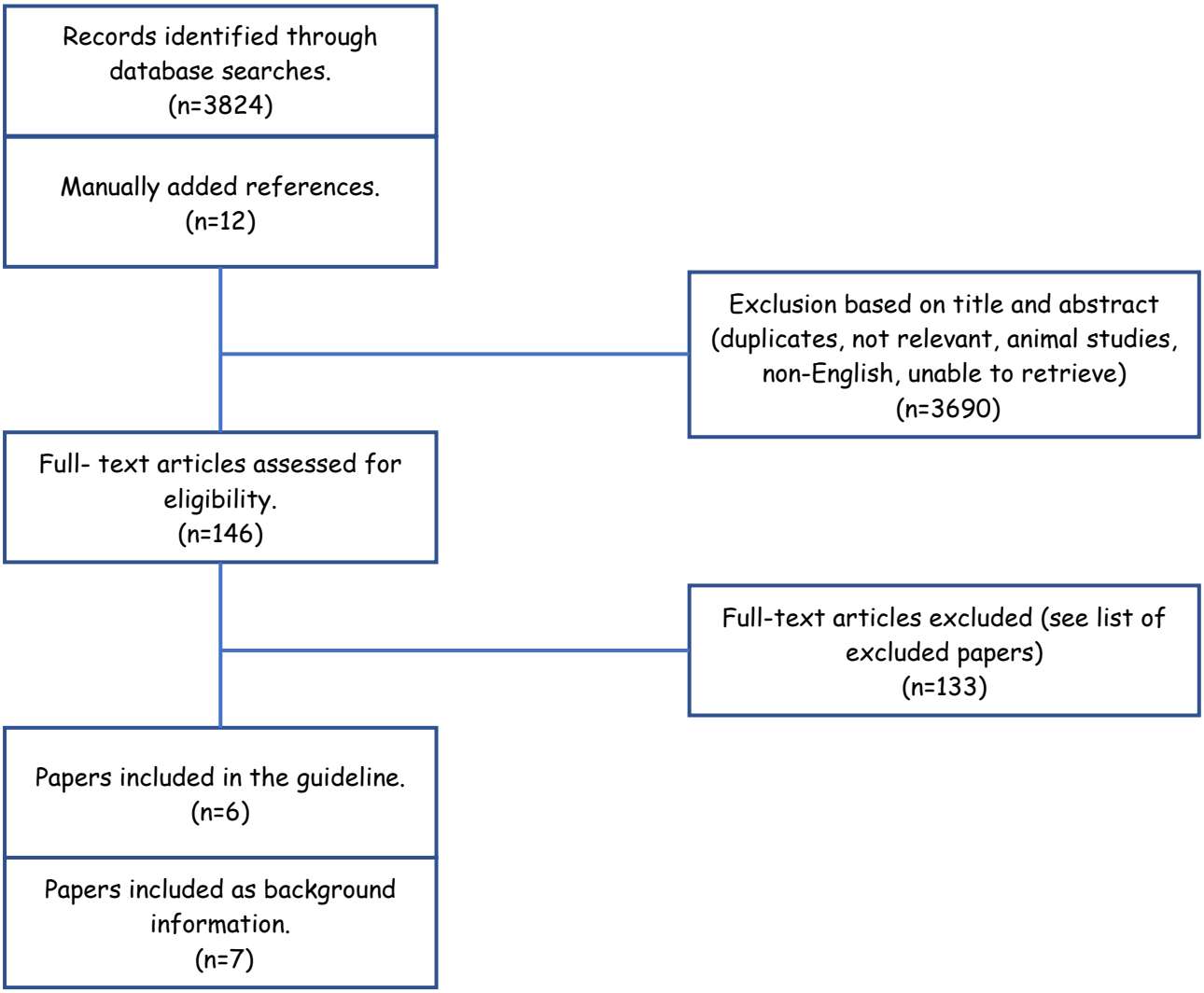
Nr	Reference	Exclusion criteria
1	Attawet J, Wang A, Li Z, Johnson L, Hammarberg K, Sullivan E. Cumulative live birth rates among gestational surrogates in altruistic surrogacy arrangements. Human fertility (Cambridge, England) 2022;25: 329-336.	No Relevant intervention
2	Attawet J, Wang AY, Farquhar CM, Jordan V, Li Z, Sullivan EA. Pregnancy and birth outcomes of single versus multiple embryo transfer in gestational surrogacy arrangements: a systematic review and meta-analysis. Human fertility (Cambridge, England) 2022;25: 217-227.	Not SET vs DET
3	Birenbaum-Carmeli D, Montebruno P. Incidence of surrogacy in the USA and Israel and implications on women's health: a quantitative comparison. Journal of assisted reproduction and genetics 2019;36: 2459-2469.	Not SET vs DET
4	Check JH, Katsoff B, Wilson C, Choe JK, Brasile D. Pregnancy outcome following fresh vs frozen embryo transfer into gestational carriers using a simplified slow freeze protocol. Clinical and experimental obstetrics & gynecology 2012;39: 23-24.	Not SET vs DET
5	Coates A, Bankowski BJ, Kung A, Griffin DK, Munne S. Differences in pregnancy outcomes in donor egg frozen embryo transfer (FET) cycles following preimplantation genetic screening (PGS): a single center retrospective study. Journal of assisted reproduction and genetics 2017;34: 71-78.	Not SET vs DET
6	Esfandiari N, Claessens EA, O'Brien A, Gotlieb L, Casper RF. Gestational carrier is an optimal method for pregnancy in patients with vaginal agenesis (Rokitansky syndrome). International journal of fertility and women's medicine 2004;49: 79-82.	Not SET vs DET
7	Machtinger R, Duvdevani NR, Lebovitz O, Dor J, Hourvitz A, Orvieto R. Outcome of gestational surrogacy according to IVF protocol. Journal of assisted reproduction and genetics 2017;34: 445-449.	study of stimulation or IVM
8	Marrs RP, Ringler GE, Stein AL, Vargyas JM, Stone BA. The use of surrogate gestational carriers for assisted reproductive technologies. American journal of obstetrics and gynecology 1993;168: 1858-1861; discussion 1861-1853.	Not SET vs DET
9	Murugappan G, Farland LV, Missmer SA, Correia KF, Anchan RM, Ginsburg ES. Gestational carrier in assisted reproductive technology. Fertility and sterility 2018;109: 420-428.	Not SET vs DET
10	Namath A, Jahandideh S, Devine K, O'Brien JE, Stillman RJ. Gestational carrier pregnancy outcomes from frozen embryo transfer depending on the number of embryos transferred and preimplantation genetic testing: a retrospective analysis. Fertility and sterility 2021;115: 1471-1477.	Not SET vs DET
11	Parkinson J, Tran C, Tan T, Nelson J, Batzofin J, Serafini P. Perinatal outcome after in-vitro fertilization-surrogacy. Human reproduction (Oxford, England) 1999;14: 671-676.	Not SET vs DET
12	Perkins KM, Boulet SL, Jamieson DJ, Kissin DM. Trends and outcomes of gestational surrogacy in the United States. Fertility and sterility 2016;106: 435-442.e432.	Not SET vs DET
13	Peters HE, Schats R, Verhoeven MO, Mijatovic V, de Groot CJM, Sandberg JL, Peeters IP, Lambalk CB. Gestational surrogacy: results of 10 years of experience in the Netherlands. Reproductive biomedicine online 2018;37: 725-731.	SET only
14	Rumpik D, Rumpikova T, Pohanka M, Ventruba P, Belaskova S. Gestational surrogacy in the Czech Republic. Biomedical papers of the Medical Faculty of the University Palacky, Olomouc, Czechoslovakia 2019;163: 155-160.	retrospective small size over long period
15	Segal TR, Kim K, Mumford SL, Goldfarb JM, Weinerman RS. How much does the uterus matter? Perinatal outcomes are improved when donor oocyte embryos are transferred to gestational carriers compared to intended parent recipients. Fertility and sterility 2018;110: 888-895.	controlled study surrogate vs own pregnancy
16	Soderstrom-Anttila V, Blomqvist T, Foudila T, Hippelainen M, Kurunmaki H, Siegberg R, Tulppala M, Tuomi-Nikula M, Vilska S, Hovatta O. Experience of in vitro fertilization surrogacy in Finland. Acta obstetricia et gynecologica Scandinavica 2002;81: 747-752.	Not SET vs DET
17	Stafford-Bell MA, Copeland CM. Surrogacy in Australia: implantation rates have implications for embryo quality and uterine receptivity. Reproduction, fertility, and development 2001;13: 99-104.	Not SET vs DET
18	Wang AY, Dill SK, Bowman M, Sullivan EA. Gestational surrogacy in Australia 2004-2011: treatment, pregnancy and birth outcomes. The Australian & New Zealand journal of obstetrics & gynaecology 2016;56: 255-259.	Not SET vs DET
19	White PM. Hidden from view: Canadian gestational surrogacy practices and outcomes, 2001-2012. Reproductive health matters 2016;24: 205-217.	Not SET vs DET
20	White PM. "One for Sorrow, Two for Joy?": American embryo transfer guideline recommendations, practices, and outcomes for gestational surrogate patients. Journal of assisted reproduction and genetics 2017;34: 431-443.	Review
21	Woo I, Hindoyan R, Landay M, Ho J, Ingles SA, McGinnis LK, Paulson RJ, Chung K. Perinatal outcomes after natural conception versus in vitro fertilization (IVF) in gestational surrogates: a model to evaluate IVF treatment versus maternal effects. Fertility and sterility 2017;108: 993-998.	Not SET vs DET

PICO 14. In fresh transfer, should embryo criteria be considered a factor in deciding to apply DET instead of (e)SET at cleavage-stage for couples/individuals undergoing ART? If yes, which criteria are appropriate?

Search strings

PUBMED	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade” OR “ embryo morphology” OR “ embryo quality”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))
COCHRANE	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Adriaenssens T, Van Vaerenbergh I, Coucke W, Segers I, Verheyen G, Anckaert E, De Vos M, Smitz J. Cumulus-corona gene expression analysis combined with morphological embryo scoring in single embryo transfer cycles increases live birth after fresh transfer and decreases time to pregnancy. Journal of assisted reproduction and genetics 2019;36: 433-443.	no set vs det
2	Ahlstrom A, Park H, Bergh C, Selleskog U, Lundin K. Conventional morphology performs better than morphokinetics for prediction of live birth after day 2 transfer. Reprod Biomed Online 2016;33: 61-70.	No relevant outcomes
3	Álvarez C, García-Garrido C, Taronger R, González de Merlo G. In vitro maturation, fertilization, embryo development & clinical outcome of human metaphase-I oocytes retrieved from stimulated intracytoplasmic sperm injection cycles. Indian J Med Res 2013;137: 331-338.	Relevant intervention is not included (no knowledge about fresh and no of embryos/ET)
4	Ao A, Ray P, Harper J, Lesko J, Paraschos T, Atkinson G, Soussis I, Taylor D, Handyside A, Hughes M et al. Clinical experience with preimplantation genetic diagnosis of cystic fibrosis (delta F508). Prenat Diagn 1996;16: 137-142.	Relevant outcomes are not assessed (cleavage stage biopsy , blasto et; not clear if fresh)
5	Arthur ID, Anthony FW, Masson GM, Thomas EJ. The selection criteria on an IVF program can remove the association between maternal age and implantation. Acta Obstet Gynecol Scand 1994;73: 562-566.	relevant intervention is not included (2.8 embryos/ET; no knowledge fresh of frozen)
6	Assou S, Haouzi D, De Vos J, Hamamah S. Human cumulus cells as biomarkers for embryo and pregnancy outcomes. Mol Hum Reprod 2010;16: 531-538.	no relevant intervention; no relevant outcomes assessed
7	Benaglia L, Cardellicchio L, Guarneri C, Paffoni A, Restelli L, Somigliana E, Fedele L. IVF outcome in women with accidental contamination of follicular fluid with endometrioma content. Eur J Obstet Gynecol Reprod Biol 2014;181: 130-134.	methodology for answering the question; special category of embryo)
8	Berkhout RP, Vergouw CG, van Wely M, de Melker AA, Schats R, Repping S, Hamer G, Mastenbroek S, Lambalk CB. The addition of a low-quality embryo as part of a fresh day 3 double embryo transfer does not improve ongoing pregnancy rates. Hum Reprod Open 2017;2017: hox020-hox020.	No relevant outcomes
9	Borini A, Lagalla C, Cattoli M, Sereni E, Sciajno R, Flamigni C, Coticchio G. Predictive factors for embryo implantation potential. Reprod Biomed Online 2005;10: 653-668.	Relevant intervention is not included (no knowledge about fresh or frozen)
10	Borman E, Check JH. A comparison of clinical pregnancy rates and multiple gestation rates with 2 vs 3 embryos transferred with pairs matched for embryo quality. Clin Exp Obstet Gynecol 2013;40: 196-197.	no relevant intervention D 2 vs D3
11	Braga DPdAF, Setti AS, Figueira RdCS, Iaconelli A, Borges E. The impact of the embryo quality on the risk of multiple pregnancies. Zygote 2015;23: 662-668.	Not SET vs DET
12	Braude P. Selecting the 'best' embryos: prospects for improvement. Reprod Biomed Online 2013;27: 644-653.	relevant intervention is not included fresh; cleavage stage
13	Brown J, Daya S, Matson P. Day three versus day two embryo transfer following in vitro fertilization or intracytoplasmic sperm injection. Cochrane Database Syst Rev 2016;12: CD004378-CD004378.	no relevant intervention D2 vs D3
14	Bungum M, Bungum L, Humaidan P, Yding Andersen C. Day 3 versus day 5 embryo transfer: a prospective randomized study. Reprod Biomed Online 2003;7: 98-104.	relevant intervention is not included set/det
15	Cai Q, Wan F, Appleby D, Hu L, Zhang H. Quality of embryos transferred and progesterone levels are the most important predictors of live birth after fresh embryo transfer: a retrospective cohort study. Journal of assisted reproduction and genetics 2014;31: 185-194.	Not relevant for this PICO

16	Cai Q, Wan F, Huang K, Zhang H. Does the number of oocytes retrieved influence pregnancy after fresh embryo transfer? PLoS One 2013;8: e56189-e56189.	relevant intervention is not included clear the no of set/det
17	Ciepiela P, Dulęba AJ, Kowaleczko E, Chełstowski K, Kurzawa R. Vitamin D as a follicular marker of human oocyte quality and a serum marker of in vitro fertilization outcome. Journal of assisted reproduction and genetics 2018;35: 1265-1276.	relevant intervention is not included set/det ; stage of ET
18	Clua E, Tur R, Coroleu B, Boada M, Barri PN, Veiga A. Analysis of factors associated with multiple pregnancy in an oocyte donation programme. Reprod Biomed Online 2010;21: 694-699.	Not relevant for this PICO
19	Clua E, Tur R, Coroleu B, Rodríguez I, Boada M, Gómez MJ, Barri PN, Veiga A. Is it justified to transfer two embryos in oocyte donation? A pilot randomized clinical trial. Reprod Biomed Online 2015;31: 154-161.	intervention is not included cleavage stage.
20	Colaci DS, Afeiche M, Gaskins AJ, Wright DL, Toth TL, Tanrikut C, Hauser R, Chavarro JE. Men's body mass index in relation to embryo quality and clinical outcomes in couples undergoing in vitro fertilization. Fertility and sterility 2012;98: 1193-1199.e1191.	relevant intervention is not included no #/ET
21	Copperman AB, Selick CE, Grunfeld L, Sandler B, Bustillo M. Cumulative number and morphological score of embryos resulting in success: realistic expectations from in vitro fertilization-embryo transfer. Fertility and sterility 1995;64: 88-92.	relevant intervention is not included (no or day of ET)
22	Cutting R. Single embryo transfer for all. Best Pract Res Clin Obstet Gynaecol 2018;53: 30-37.	review
23	de los Santos MJ, Arroyo G, Busquet A, Calderón G, Cuadros J, Hurtado de Mendoza MV, Moragas M, Herrer R, Ortiz A, Pons C et al. A multicenter prospective study to assess the effect of early cleavage on embryo quality, implantation, and live-birth rate. Fertility and sterility 2014;101: 981-987.	no relevant intervention set vs det
24	De Vos A, Van de Velde H, Joris H, Van Steirteghem A. In-vitro matured metaphase-I oocytes have a lower fertilization rate but similar embryo quality as mature metaphase-II oocytes after intracytoplasmic sperm injection. Hum Reprod 1999;14: 1859-1863.	relevant intervention is not included (day of ET and no of embryos)
25	Dean NL, Phillips SJ, Buckett WM, Biljan MM, Tan SL. Impact of reducing the number of embryos transferred from three to two in women under the age of 35 who produced three or more high-quality embryos. Fertility and sterility 2000;74: 820-823.	relevant intervention is not included (no ET with 1 embryo)
26	Dennis SJ, Thomas MA, Williams DB, Robins JC. Embryo morphology score on day 3 is predictive of implantation and live birth rates. Journal of assisted reproduction and genetics 2006;23: 171-175.	relevant intervention is not included (no ET with 1 embryo)
27	Dhont M. Single-embryo transfer. Semin Reprod Med 2001;19: 251-258.	relevant intervention is not included fresh; cleavage stage
28	Ebner T, Oppelt P, Wöber M, Staples P, Mayer RB, Sonnleitner U, Bulfon-Vogl S, Gruber I, Haid AE, Shebl O. Treatment with Ca2+ ionophore improves embryo development and outcome in cases with previous developmental problems: a prospective multicenter study. Hum Reprod 2015;30: 97-102.	not clear data of no/et
29	Ebner T, Yaman C, Moser M, Sommergruber M, Pölz W, Tews G. Embryo fragmentation in vitro and its impact on treatment and pregnancy outcome. Fertility and sterility 2001;76: 281-285.	see above
30	Ertzeid G, Dale PO, Tanbo T, Storeng R, Kjekshus E, Abyholm T. Clinical outcome of day 2 versus day 3 embryo transfer using serum-free culture media: a prospective randomized study. Journal of assisted reproduction and genetics 1999;16: 529-534.	not clear data about the no/et
31	Ertzeid G, Storeng R, Tanbo T, Dale PO, Bjercke S, Abyholm T. Cycle characteristics of day 3 embryo transfers with 4-cell embryos only. Journal of assisted reproduction and genetics 2003;20: 352-357.	see above
32	Frydman N, Madoux S, Hesters L, Duvernoy C, Feyereisen E, Le Du A, Tachdjian G, Frydman R, Fanchin R. A randomized double-blind controlled study on the efficacy of laser zona pellucida thinning on live birth rates in cases of advanced female age. Hum Reprod 2006;21: 2131-2135.	too many embryos/transfer
33	Fu J, Wang X-J, Wang Y-W, Sun J, Gemzell-Danielsson K, Sun X-X. The influence of early cleavage on embryo developmental potential and IVF/ICSI outcome. Journal of assisted reproduction and genetics 2009;26: 437-441.	no relevant intervention set vs det
34	Fujimoto A, Morishima K, Harada M, Hirata T, Osuga Y, Fujii T. Elective single-embryo transfer improves cumulative pregnancy outcome in young patients but not in women of advanced reproductive age. Journal of assisted reproduction and genetics 2015;32: 1773-1779.	No relevant outcomes

35	Gatimel N, Ladj M, Teston C, Lesourd F, Fajau C, Cohade C, Parinaud J, Léandri RD. How many embryos should be transferred? A validated score to predict ongoing implantation rate. Eur J Obstet Gynecol Reprod Biol 2017;212: 30-36.	No relevant outcomes
36	Gerris J. Single-embryo transfer versus multiple-embryo transfer. Reprod Biomed Online 2009;18 Suppl 2: 63-70.	Not relevant for this PICO
37	Giorgetti C, Terriou P, Auquier P, Hans E, Spach JL, Salzmann J, Roulier R. Embryo score to predict implantation after in-vitro fertilization: based on 957 single embryo transfers. Hum Reprod 1995;10: 2427-2431.	only one embryo transfer
38	Gronow MJ, Martin MJ, McBain JC, Wein P, Speirs AL, Lopata A. Aspects of multiple embryo transfer. Ann N Y Acad Sci 1985;442: 381-386.	the stage not clearly specified
39	Guerif F, Bidault R, Gasnier O, Couet ML, Gervereau O, Lansac J, Royere D. Efficacy of blastocyst transfer after implantation failure. Reprod Biomed Online 2004;9: 630-636.	D2 vs D5, no relevant intervention
40	Guerif F, Frapsauce C, Chavez C, Cadoret V, Royere D. Treating women under 36 years old without top-quality embryos on day 2: a prospective study comparing double embryo transfer with single blastocyst transfer. Hum Reprod 2011;26: 775-781.	only DET in D3 vs set on D5
41	Guo N, Yang F, Liu Q, Ren X, Zhao H, Li Y, Ai J. Effects of cumulus cell removal time during in vitro fertilization on embryo quality and pregnancy outcomes: a prospective randomized sibling-oocyte study. Reprod Biol Endocrinol 2016;14: 18-18.	only det
42	Han EJ, Kim SK, Lee JR, Jee BC, Suh CS, Kim SH. Multiple pregnancy after single or multiple embryo transfer performed according to Korean guidelines. Clin Exp Reprod Med 2015;42: 169-174.	no relevant intervention set vs det
43	Hellberg D, Blennborn M, Nilsson S. Defining women who are prone to have twins in in vitro fertilization--a necessary step towards single embryo transfer. Journal of assisted reproduction and genetics 2005;22: 199-206.	no relevant intervention set vs det
44	Hill MJ, Royster GDt, Healy MW, Richter KS, Levy G, DeCherney AH, Levens ED, Suthar G, Widra E, Levy MJ. Are good patient and embryo characteristics protective against the negative effect of elevated progesterone level on the day of oocyte maturation? Fertility and sterility 2015;103: 1477-1484.e1845.	no relevant intervention set vs det
45	Hofmann GE, Bentzien F, Bergh PA, Garrisi GJ, Williams MC, Guzman I, Navot D. Premature luteinization in controlled ovarian hyperstimulation has no adverse effect on oocyte and embryo quality. Fertility and sterility 1993;60: 675-679.	no relevant intervention set vs det
46	Hu X, Luo Y, Huang K, Li Y, Xu Y, Zhou C, Mai Q. New Perspectives on Criteria for the Determination of HCG Trigger Timing in GnRH Antagonist Cycles. Medicine (Baltimore) 2016;95: e3691-e3691.	no relevant intervention set vs det
47	Hu Y, Maxson WS, Hoffman DI, Ory SJ, Eager S, Dupre J, Lu C. Maximizing pregnancy rates and limiting higher-order multiple conceptions by determining the optimal number of embryos to transfer based on quality. Fertility and sterility 1998;69: 650-657.	no relevant intervention set vs det
48	Jackson KV, Ginsburg ES, Hornstein MD, Rein MS, Clarke RN. Multinucleation in normally fertilized embryos is associated with an accelerated ovulation induction response and lower implantation and pregnancy rates in in vitro fertilization-embryo transfer cycles. Fertility and sterility 1998;70: 60-66.	no relevant intervention set vs det
49	Jinno M, Katsumata Y, Hoshiai T, Nakamura Y, Matsumoto K, Yoshimura Y. A therapeutic role of prolactin supplementation in ovarian stimulation for in vitro fertilization: the bromocriptine-rebound method. J Clin Endocrinol Metab 1997;82: 3603-3611.	no data regarding the number of embryos and embryo transfers
50	Kasterstein E, Strassburger D, Komarovsky D, Bern O, Komsky A, Raziel A, Friedler S, Ron-El R. The effect of two distinct levels of oxygen concentration on embryo development in a sibling oocyte study. Journal of assisted reproduction and genetics 2013;30: 1073-1079.	too many embryos, no relevant intervention
51	Keane KN, Yovich JL, Hamidi A, Hinchliffe PM, Dhaliwal SS. Single-centre retrospective analysis of growth hormone supplementation in IVF patients classified as poor-prognosis. BMJ Open 2017;7: e018107-e018107.	not clear data on no of embryos transferred
52	Keltz MD, Skorupski JC, Bradley K, Stein D. Predictors of embryo fragmentation and outcome after fragment removal in in vitro fertilization. Fertility and sterility 2006;86: 321-324.	not clear data on no of embryos transferred
53	Lee S-H, Park CW, Cheon Y-P, Lim CK. Potential of testicular sperm to support embryonic development to the blastocyst stage is comparable to that of ejaculated sperm. Journal of assisted reproduction and genetics 2018;35: 1103-1111.	not clear data on no of embryos transferred
54	Lee T-H, Chen C-D, Tsai Y-Y, Chang L-J, Ho H-N, Yang Y-S. Embryo quality is more important for younger women whereas age is more important for older women with regard to in vitro fertilization outcome and multiple pregnancy. Fertility and sterility 2006;86: 64-69.	day5, no relevant population
55	Li J, Du M, Zhang Z, Guan Y, Wang X, Zhang X, Liu J, Pan Z, Wang B, Liu W. Does a poor-quality embryo have an adverse impact on a good-quality embryo when transferred together? J Ovarian Res 2018;11: 78-78.	Only DET
56	Li Y, Yang W, Chen X, Li L, Zhang Q, Yang D. Comparison between follicular stimulation and luteal stimulation protocols with clomiphene and HMG in women with poor ovarian response. Gynecol Endocrinol 2016;32: 74-77.	too many embryos/ET, not SET vs DET
57	Lind T, Holte J, Olofsson JI, Hadziosmanovic N, Gudmundsson J, Nedstrand E, Lood M, Berglund L, Rodriguez-Wallberg K. Reduced live-birth rates after IVF/ICSI in women with previous unilateral oophorectomy: results of a multicentre cohort study. Hum Reprod 2018;33: 238-247.	no relevant intervention set vs det

58	Luke B, Brown MB, Stern JE, Jindal SK, Racowsky C, Ball GD. Using the Society for Assisted Reproductive Technology Clinic Outcome System morphological measures to predict live birth after assisted reproductive technology. Fertility and sterility 2014;102: 1338-1344.	Not relevant for this PICO
59	Majumdar G, Majumdar A. A prospective randomized study to evaluate the effect of hyaluronic acid sperm selection on the intracytoplasmic sperm injection outcome of patients with unexplained infertility having normal semen parameters. Journal of assisted reproduction and genetics 2013;30: 1471-1475.	relevant interventions are not included no clear data about the no/fresh ICSI vs PICSI
60	Majumder K, Gelbaya TA, Laing I, Nardo LG. 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: 166-170.	no relevant information set vs det
61	Martin C, Chang J, Boulet S, Jamieson DJ, Kissin D. Factors predicting double embryo implantation following double embryo transfer in assisted reproductive technology: implications for elective single embryo transfer. Journal of assisted reproduction and genetics 2016;33: 1343-1353.	see above (no morphology)
62	Mateizel I, Van Landuyt L, Tournaye H, Verheyen G. Deliveries of normal healthy babies from embryos originating from oocytes showing the presence of smooth endoplasmic reticulum aggregates. Hum Reprod 2013;28: 2111-2117.	see above
63	Matorras R, Otero B, Mendoza R, Expósito A, De Pablo JL, Larreategui Z, Ayerdi F, Matorras F. Quality of additional embryos transferred on pregnancy outcomes in IVF: predictions using a mathematical approach. Reprod Biomed Online 2014;29: 200-208.	no relevant intervention SET vs DET
64	Medicine ASIR, Embryology ESIG. Istanbul consensus workshop on embryo assessment: proceedings of an expert meeting. Reprod Biomed Online 2011;22: 632-646.	no relevant population included
65	Mersereau J, Stanhiser J, Coddington C, Jones T, Luke B, Brown MB. Patient and cycle characteristics predicting high pregnancy rates with single-embryo transfer: an analysis of the Society for Assisted Reproductive Technology outcomes between 2004 and 2013. Fertility and sterility 2017;108: 750-756.	Included in female age chapter
66	Murber A, Fancsovits P, Ledó N, Szakács M, Rigó J, Urbancsek J. Impact of highly purified versus recombinant follicle stimulating hormone on oocyte quality and embryo development in intracytoplasmic sperm injection cycles. Acta Biol Hung 2011;62: 255-264.	ET with 1-3 embryos
67	Neubourg DD, Mangelschots K, Van Royen E, Vercruyssen M, Ryckaert G, Valkenburg M, Barudy-Vasquez J, Gerris J. Impact of patients' choice for single embryo transfer of a top quality embryo versus double embryo transfer in the first IVF/ICSI cycle. Hum Reprod 2002;17: 2621-2625.	Not relevant for this PICO
68	Noyes N, Hampton BS, Berkeley A, Licciardi F, Grifo J, Krey L. Factors useful in predicting the success of oocyte donation: a 3-year retrospective analysis. Fertility and sterility 2001;76: 92-97.	Not relevant for this PICO
69	Oyesanya OA, Olufowobi O, Ross W, Sharif K, Afnan M. Prognosis of oocyte donation cycles: a prospective comparison of the in vitro fertilization-embryo transfer cycles of recipients who used shared oocytes versus those who used altruistic donors. Fertility and sterility 2009;92: 930-936.	Not relevant for this PICO
70	Pallinger E, Bognar Z, Bodis J, Csabai T, Farkas N, Godony K, Varnagy A, Buzas E, Szekeres-Bartho J. A simple and rapid flow cytometry-based assay to identify a competent embryo prior to embryo transfer. Sci Rep 2017;7: 39927-39927.	day5, no relevant population
71	Papanikolaou EG, D'Haeseleer E, Verheyen G, Van de Velde H, Camus M, Van Steirteghem A, Devroey P, Tournaye H. Live birth rate is significantly higher after blastocyst transfer than after cleavage-stage embryo transfer when at least four embryos are available on day 3 of embryo culture. A randomized prospective study. Hum Reprod 2005;20: 3198-3203.	relevant interventions are not included only det
72	Park Y-S, Kim MK, Lim CK, Lee S-H, Park D-W, Seo JT, Yang KM. Efficacy of cryopreservation of embryos generated by intracytoplasmic sperm injection with spermatozoa from frozen testicular tissue. Journal of assisted reproduction and genetics 2014;31: 1331-1336.	No relevant intervention
73	Parsanezhad ME, Jahromi BN, Rezaee S, Kooshesh L, Alaee S. The effect of four different gonadotropin protocols on oocyte and embryo quality and pregnancy outcomes in IVF/ICSI cycles; a randomized controlled trial. Iranian journal of medical sciences 2017;42: 57-65.	relevant interventions are not included too many embryos transferred
74	Paternot G, Debrock S, De Neubourg D, D'Hooghe TM, Spiessens C. The spatial arrangement of blastomeres at the 4-cell stage and IVF outcome. Reprod Biomed Online 2014;28: 198-203.	no relevant intervention set vs det
75	Paternot G, Debrock S, D'Hooghe T, Spiessens C. Computer-assisted embryo selection: a benefit in the evaluation of embryo quality? Reprod Biomed Online 2011;23: 347-354.	no relevant outcome was assessed
76	Qu F, Wang FF, Wu Y, Zhou J, Robinson N, Hardiman PJ, Pan JX, He YJ, Zhu YH, Wang HZ et al. Transcutaneous Electrical Acupoint Stimulation Improves the Outcomes of In Vitro Fertilization: a Prospective, Randomized and Controlled Study. Explore (new york, NY) 2017;13: 306-312.	relevant interventions are not included no data on set det
77	Rama Raju GA, Jaya Prakash G, Murali Krishna K, Madan K. Neonatal outcome after vitrified day 3 embryo transfers: a preliminary study. Fertility and sterility 2009;92: 143-148.	No relevant population
78	Raziel A, Friedler S, Strassburger D, Komarovsky D, Kasterstein E, Ron-el R. Reproductive performance of patients undergoing intracytoplasmic sperm injection with 100% implantation rate. Journal of assisted reproduction and genetics 2000;17: 379-384.	No relevant population

79	Reynolds MA, Schieve LA, Jeng G, Peterson HB, Wilcox LS. Risk of multiple birth associated with in vitro fertilization using donor eggs. Am J Epidemiol 2001;154: 1043-1050.	no relevant intervention set vs det
80	Rhenman A, Berglund L, Brodin T, Olovsson M, Milton K, Hadziosmanovic N, Holte J. Which set of embryo variables is most predictive for live birth? A prospective study in 6252 single embryo transfers to construct an embryo score for the ranking and selection of embryos. Hum Reprod 2015;30: 28-36.	No relevant population
81	Roberts SA, Fitzgerald CT, Brison DR. Modelling the impact of single embryo transfer in a national health service IVF programme. Hum Reprod 2009;24: 122-131.	No relevant population
82	Roberts SA, Hirst WM, Brison DR, Vail A, toward SETc. Embryo and uterine influences on IVF outcomes: an analysis of a UK multi-centre cohort. Hum Reprod 2010;25: 2792-2802.	no relevant intervention set vs det
83	Rodriguez-Purata J, Lee J, Whitehouse M, Duke M, Grunfeld L, Sandler B, Copperman A, Mukherjee T. Reproductive outcome is optimized by genomic embryo screening, vitrification, and subsequent transfer into a prepared synchronous endometrium. Journal of assisted reproduction and genetics 2016;33: 401-412.	no relevant intervention set vs det
84	Romany L, Garrido N, Motato Y, Aparicio B, Remohi J, Meseguer M. Removal of annexin V-positive sperm cells for intracytoplasmic sperm injection in ovum donation cycles does not improve reproductive outcome: a controlled and randomized trial in unselected males. Fertility and sterility 2014;102: 1567-1575.	no relevant intervention included set vs det
85	Sarkar P, Gandhi A, Plosker S, Ying Y, Mayer J, Imudia AN. Does supraphysiologic estradiol level during IVF have any effect on oocyte/embryo quality? A sibling embryo cohort analysis of fresh and subsequent frozen embryo transfer. Minerva Ginecol 2018;70: 716-723.	Not relevant for this PICO
86	Sato W, Fukuda J, Kanamori K, Kawamura K, Kumagai J, Kodama H, Tanaka T. Evaluation of possible criteria for elective single embryo transfer. Reproductive medicine and biology 2010;9: 107-113.	No relevant intervention
87	Schieve LA, Peterson HB, Meikle SF, Jeng G, Danel I, Burnett NM, Wilcox LS. Live-birth rates and multiple-birth risk using in vitro fertilization. JAMA 1999;282: 1832-1838.	not clear data on stage and or fresh or frozen
88	Scott LA, Smith S. The successful use of pronuclear embryo transfers the day following oocyte retrieval. Hum Reprod 1998;13: 1003-1013.	see above
89	Selick CE, Hofmann GE, Albano C, Horowitz GM, Copperman AB, Garrisi GJ, Navot D. Embryo quality and pregnancy potential of fresh compared with frozen embryos--is freezing detrimental to high quality embryos? Hum Reprod 1995;10: 392-395.	relevant interventions are not included-too many embryos fresh vs frozen
90	Setti PEL, Cavagna M, Albani E, Morreale G, Novara PV, Cesana A, Parini V. Outcome of assisted reproductive technologies after different embryo transfer strategies. Reprod Biomed Online 2005;11: 64-70.	No relevant intervention
91	Shulman A, Ben-Nun I, Ghetler Y, Kaneti H, Shilon M, Beyth Y. Relationship between embryo morphology and implantation rate after in vitro fertilization treatment in conception cycles. Fertility and sterility 1993;60: 123-126.	No relevant intervention
92	Sifer C, Herbemont C, Adda-Herzog E, Sermondade N, Dupont C, Cedrin-Durnerin I, Poncelet C, Levy R, Grynberg M, Hugues J-N. Clinical predictive criteria associated with live birth following elective single embryo transfer. Eur J Obstet Gynecol Reprod Biol 2014;181: 229-232.	no relevant intervention set vs det
93	Sifer C, Sermondade N, Poncelet C, Hafhouf E, Porcher R, Cedrin-Durnerin I, Benzacken B, Levy R, Hugues J-N. Biological predictive criteria for clinical pregnancy after elective single embryo transfer. Fertility and sterility 2011;95: 427-430.	only e set
94	Simopoulou M, Sfakianoudis K, Antoniou N, Maziotis E, Rapani A, Bakas P, Anifandis G, Kalampokas T, Bolaris S, Pantou A et al. Making IVF more effective through the evolution of prediction models: is prognosis the missing piece of the puzzle? Syst Biol Reprod Med 2018;64: 305-323.	No relevant for this PICO
95	Stern JE, Lieberman ES, Macaluso M, Racowsky C. Is cryopreservation of embryos a legitimate surrogate marker of embryo quality in studies of assisted reproductive technology conducted using national databases? Fertility and sterility 2012;97: 890-893.	not fresh, no relevant population
96	Styer AK, Luke B, Vitek W, Christianson MS, Baker VL, Christy AY, Polotsky AJ. Factors associated with the use of elective single-embryo transfer and pregnancy outcomes in the United States, 2004-2012. Fertility and sterility 2016;106: 80-89.	no relevant intervention
97	Sunde A. Significant reduction of twins with single embryo transfer in IVF. Reprod Biomed Online 2007;15 Suppl 3: 28-34.	Narrative review
98	Suzuki T, Shibahara H, Hirano Y, Ohno A, Takamizawa S, Suzuki M. Randomized study comparing day 2 versus day 3 elective transfer of two good-quality embryos. Reproductive medicine and biology 2004;3: 99-104.	No relevant population
99	Tannus S, Hatirnaz S, Tan J, Ata B, Tan S-L, Hatirnaz E, Kenat-Pektas M, Dahan M-H. Predictive factors for live birth after in vitro maturation of oocytes in women with polycystic ovary syndrome. Arch Gynecol Obstet 2018;297: 199-204.	ivm, not relevant for this PICO
100	Tiitinen A. Single embryo transfer: Why and how to identify the embryo with the best developmental potential. Best Pract Res Clin Endocrinol Metab 2019;33: 77-88.	Narrative review
101	Vaegter KK, Lakic TG, Olovsson M, Berglund L, Brodin T, Holte J. Which factors are most predictive for live birth after in vitro fertilization and intracytoplasmic sperm injection (IVF/ICSI) treatments? Analysis of 100 prospectively recorded variables in 8,400 IVF/ICSI single-embryo transfers. Fertility and sterility 2017;107: 641-648.e642.	relevant intervention is not included no data about 2 embryos transferred

102	Van Heertum K, Somkuti S, Nichols J, Schinfeld J, Sobel M, Barmat L. Randomized Controlled Trial of Autologous Endometrial Coculture Versus Traditional in Vitro Fertilization. J Reprod Med 2017;62: 329-332.	Not relevant for this PICO
103	van Montfoort AP, Fiddelers AA, Janssen JM, Derhaag JG, Dirksen CD, Dunselman GA, Land JA, Geraedts JP, Evers JL, Dumoulin JC. In unselected patients, elective single embryo transfer prevents all multiples, but results in significantly lower pregnancy rates compared with double embryo transfer: a randomized controlled trial. Hum Reprod 2006;21: 338-343.	No relevant population
104	van Montfoort APA, Dumoulin JCM, Land JA, Coonen E, Derhaag JG, Evers JLH. Elective single embryo transfer (eSET) policy in the first three IVF/ICSI treatment cycles. Hum Reprod 2005;20: 433-436.	No relevant population
105	van Os HC, Alberda AT, Janssen-Caspers HA, Leerentveld RA, Scholtes MC, Zeilmaker GH. The influence of the interval between in vitro fertilization and embryo transfer and some other variables on treatment outcome. Fertility and sterility 1989;51: 360-362.	relevant intervention is not included- no data about no of embryos
106	Vanhoutte L, De Sutter P, Van der Elst J, Dhont M. Clinical benefit of metaphase I oocytes. Reprod Biol Endocrinol 2005;3: 71-71.	relevant intervention is not included (no or day of ET
107	Veleva Z, Orava M, Nuojua-Huttunen S, Tapanainen JS, Martikainen H. Factors affecting the outcome of frozen-thawed embryo transfer. Hum Reprod 2013;28: 2425-2431.	relevant intervention is not included - only data for frozen /thaw embryos
108	Vergouw CG, Kieslinger DC, Kostelijk EH, Botros LL, Schats R, Hompes PG, Sakkas D, Lambalk CB. Day 3 embryo selection by metabolomic profiling of culture medium with near-infrared spectroscopy as an adjunct to morphology: a randomized controlled trial. Hum Reprod 2012;27: 2304-2311.	relevant intervention is not included-no data about set
109	Vernon M, Stern JE, Ball GD, Wininger D, Mayer J, Racowsky C. Utility of the national embryo morphology data collection by the Society for Assisted Reproductive Technologies (SART): correlation between day-3 morphology grade and live-birth outcome. Fertility and sterility 2011;95: 2761-2763.	relevant intervention is not included-no data about set
110	Vilska S, Tiitinen A, Hydén-Granskog C, Hovatta O. Elective transfer of one embryo results in an acceptable pregnancy rate and eliminates the risk of multiple birth. Hum Reprod 1999;14: 2392-2395.	Not relevant for this PICO
111	Visser DS, Fourie FR. The applicability of the cumulative embryo score system for embryo selection and quality control in an in-vitro fertilization/embryo transfer programme. Hum Reprod 1993;8: 1719-1722.	only 6 patients with set
112	Vural B, Sofuoglu K, Caliskan E, Delikara N, Aksoy E, Uslu H, Karan A. Predictors of intracytoplasmic sperm injection (ICSI) outcome in couples with and without male factor infertility. Clin Exp Obstet Gynecol 2005;32: 158-162.	full text not found
113	Wang X-l, Zhang X, Qin Y-q, Hao D-y, Shi H-r. Outcomes of day 3 embryo transfer with vitrification using Cryoleaf: a 3-year follow-up study. Journal of assisted reproduction and genetics 2012;29: 883-889.	relevant intervention is not included-no data about fresh embryo transfers
114	Windt ML, Kruger TF, Coetzee K, Lombard CJ. Comparative analysis of pregnancy rates after the transfer of early dividing embryos versus slower dividing embryos. Hum Reprod 2004;19: 1155-1162.	relevant intervention is not included-no data about set
115	Winger EE, Reed JL, Ashoush S, El-Toukhy T, Taranissi M. Die-off ratio correlates with increased TNF-α:IL-10 ratio and decreased IVF success rates correctable with humira. Am J Reprod Immunol 2012;68: 428-437.	relevant intervention is not included-no data about set
116	Wintner EM, Hershko-Klement A, Tzadikevitch K, Ghetler Y, Gonen O, Wintner O, Shulman A, Wiser A. Does the transfer of a poor-quality embryo together with a good quality embryo affect the In Vitro Fertilization (IVF) outcome? J Ovarian Res 2017;10: 2-2.	No relevant population
117	Witjes H, Stegmann BJ, Elbers J, Gordon K, Mannaerts B, Barmat L, Bayer S, Boostanfar R, Carson S, Crain J et al. 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. Fertility and sterility 2015;104: 94-103.e101.	relevant intervention is not included-no data about set
118	Wittemer C, Bettahar-Lebugle K, Ohl J, Rongières C, Nisand I, Gerlinger P. Zygote evaluation: an efficient tool for embryo selection. Hum Reprod 2000;15: 2591-2597.	relevant intervention is not included
119	Wu L, Han W, Wang J, Zhang X, Liu W, Xiong S, Han S, Liu J, Gao Y, Huang G. Embryo culture using a time-lapse monitoring system improves live birth rates compared with a conventional culture system: a prospective cohort study. Hum Fertil (Camb) 2018;21: 255-262.	relevant intervention is not included-no data about set

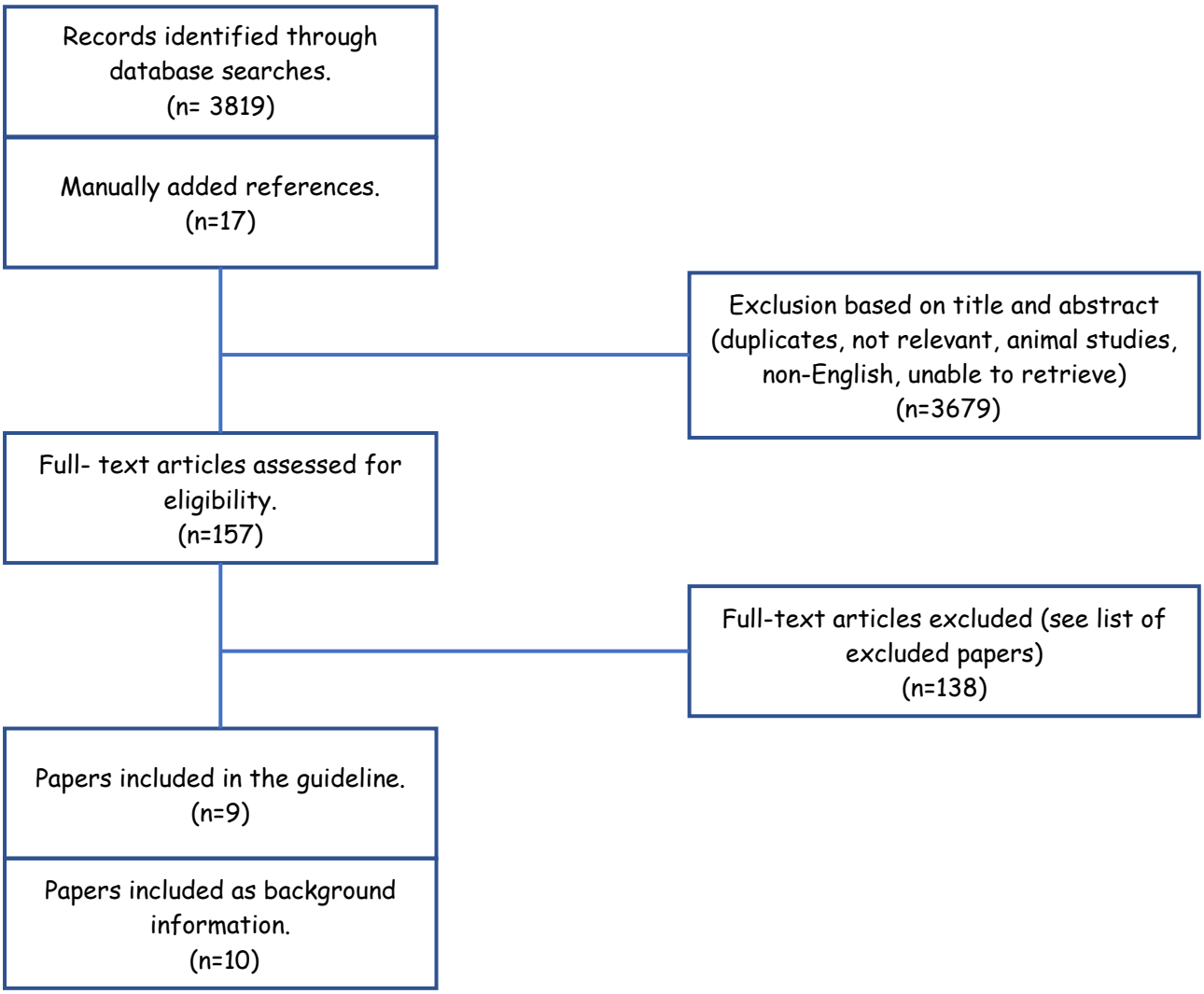
120	Wu L, Han W, Zhang X, Wang J, Liu W, Xiong S, Huang G. A retrospective analysis of morphokinetic parameters according to the implantation outcome of IVF treatment. Eur J Obstet Gynecol Reprod Biol 2016;197: 186-190.	relevant intervention is not included-no data about 2 embryos transferred
121	Xu Y, Nisenblat V, Lu C, Li R, Qiao J, Zhen X, Wang S. Pretreatment with coenzyme Q10 improves ovarian response and embryo quality in low-prognosis young women with decreased ovarian reserve: a randomized controlled trial. Reprod Biol Endocrinol 2018;16: 29-29.	no relevant intervention no set vs det
122	Xu Z, Meng L, Pan C, Chen X, Huang X, Yang H. Does oral contraceptives pretreatment affect the pregnancy outcome in polycystic ovary syndrome women undergoing ART with GnRH agonist protocol? Gynecol Endocrinol 2019;35: 124-127.	see above
123	Yeh JS, Steward RG, Dude AM, Shah AA, Goldfarb JM, Muasher SJ. Pregnancy rates in donor oocyte cycles compared to similar autologous in vitro fertilization cycles: an analysis of 26,457 fresh cycles from the Society for Assisted Reproductive Technology. Fertility and sterility 2014;102: 399-404.	relevant intervention is not included-no data about no ef embryos transferred
124	Yetkinel S, Kilicdag EB, Aytac PC, Haydardedeoglu B, Simsek E, Cok T. Effects of the microfluidic chip technique in sperm selection for intracytoplasmic sperm injection for unexplained infertility: a prospective, randomized controlled trial. Journal of assisted reproduction and genetics 2019;36: 403-409.	relevant intervention is not included-no data about 2 embryos transferred not SET vs DET
125	Yoon HG, Yoon SH, Son WY, Kim JG, Im KS, Lim JH. Alternative embryo transfer on day 3 or day 5 for reducing the risk of multiple gestations. Journal of assisted reproduction and genetics 2001;18: 262-267.	no specific data about no of embryos transferred on day 3
126	Yu Y, Xi Q, Pan Y, Jiang Y, Zhang H, Li L, Liu R. Pregnancy and Neonatal Outcomes in Azoospermic Men After Intracytoplasmic Sperm Injection Using Testicular Sperm and Donor Sperm. Med Sci Monit 2018;24: 6968-6974.	relevant intervention is not included-et performed only with 2 embryos
127	Zavy MT, Craig LB, Wild RA, Kahn SN, O'Leary D, Hansen KR. In high responding patients undergoing an initial IVF cycle, elevated estradiol on the day of hCG has no effect on live birth rate. Reprod Biol Endocrinol 2014;12: 119-119.	relevant intervention is not included-the no of embryos transferred is not clear
128	Zayed F, Lenton EA, Cooke ID. Natural cycle in-vitro fertilization in couples with unexplained infertility: impact of various factors on outcome. Hum Reprod 1997;12: 2402-2407.	relevant interventions are not included -just single embryo transfer on day 3
129	Zhan Q, Ye Z, Clarke R, Rosenwaks Z, Zaninovic N. Direct Unequal Cleavages: Embryo Developmental Competence, Genetic Constitution and Clinical Outcome. PLoS One 2016;11: e0166398-e0166398.	relevant interventions are not included
130	Zhang B, Meng Y, Jiang X, Liu C, Zhang H, Cui L, Chen Z-J. IVF outcomes of women with discrepancies between age and serum anti-Müllerian hormone levels. Reprod Biol Endocrinol 2019;17: 58-58.	relevant interventions are not included
131	Zhao H, Liu H, Li M, Ma S, Li C, Wu K. Over Ten-Cell Good Embryo Transfers on Day Three have Equivalent Clinical Outcomes with Those of Eight-Cell Embryos in Female Patients Aged ≤35 Years: A Retrospective Cohort Study. Gynecol Obstet Invest 2019;84: 298-304.	no relevant intervention det only
132	Zhao X, Ma B, Mo S, Ma L, Chang F, Zhang L, Xu F, Wang L. Improvement of pregnancy outcome by extending embryo culture in IVF-ET during clinical application. Journal of assisted reproduction and genetics 2018;35: 321-329.	relevant interventions are not included (SET on day 3)
133	Zhou L, Wang J, Xiao L, Sun H, Wang Y, Geng L, Hao G, Zhang C, Xu L, Qian W. Differential effects of short co-incubation of gametes and early removal of cumulus cells in patients with different fertilizing capabilities. Reprod Biomed Online 2016;32: 591-596.	relevant intervention is not included (SET on day3)

PICO 15. In fresh embryo transfer at blastocyst stage, should embryo criteria be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART? If yes, which criteria are appropriate?

Search strings

PUBMED	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade” OR “ embryo morphology” OR “ embryo quality”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))
COCHRANE	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))

Flowchart



List of excluded studies

Nr	References	Exclusion criteria
1	Arthur ID, Anthony FW, Masson GM, Thomas EJ. The selection criteria on an IVF program can remove the association between maternal age and implantation. Acta Obstet Gynecol Scand 1994;73: 562-566.	Not relevant for this PICO
2	Assou S, Haouzi D, De Vos J, Hamamah S. Human cumulus cells as biomarkers for embryo and pregnancy outcomes. Mol Hum Reprod 2010;16: 531-538.	Review on cumulus cells
3	Balaban B, Urman B, Alatas C, Mercan R, Aksoy S, Isiklar A. Blastocyst-stage transfer of poor-quality cleavage-stage embryos results in higher implantation rates. Fertil Steril 2001;75: 514-518.	Not relevant for this PICO
4	Benaglia L, Cardellicchio L, Guarneri C, Paffoni A, Restelli L, Somigliana E, Fedele L. IVF outcome in women with accidental contamination of follicular fluid with endometrioma content. Eur J Obstet Gynecol Reprod Biol 2014;181: 130-134.	Cleavage stage
5	Blake DA, Farquhar CM, Johnson N, Proctor M. Cleavage stage versus blastocyst stage embryo transfer in assisted conception. The Cochrane database of systematic reviews 2007: Cd002118.	Not relevant for this PICO
6	Borini A, Lagalla C, Cattoli M, Sereni E, Sciajno R, Flamigni C, Coticchio G. Predictive factors for embryo implantation potential. Reprod Biomed Online 2005;10: 653-668.	Unspecified review
7	Braga DPdAF, Setti AS, Figueira RdCS, Iaconelli A, Borges E. The impact of the embryo quality on the risk of multiple pregnancies. Zygote 2015;23: 662-668.	Not SET vs DET
8	Braude P. Selecting the 'best' embryos: prospects for improvement. Reprod Biomed Online 2013;27: 644-653.	Blastocysts almost not mentioned
9	Bungum M, Bungum L, Humaidan P, Yding Andersen C. Day 3 versus day 5 embryo transfer: a prospective randomized study. Reprod Biomed Online 2003;7: 98-104.	no relevant intervention
10	Cai Q, Wan F, Appleby D, Hu L, Zhang H. Quality of embryos transferred and progesterone levels are the most important predictors of live birth after fresh embryo transfer: a retrospective cohort study. Journal of assisted reproduction and genetics 2014;31: 185-194.	Cleavage stage, No relevant population

11	Cai Q, Wan F, Huang K, Zhang H. Does the number of oocytes retrieved influence pregnancy after fresh embryo transfer? PLoS One 2013;8: e56189-e56189.	Cleavage stage, No relevant population
12	Capalbo A, Rienzi L, Cimadomo D, Maggiulli R, Elliott T, Wright G, Nagy ZP, Ubaldi FM. Correlation between standard blastocyst morphology, euploidy and implantation: an observational study in two centers involving 956 screened blastocysts. Hum Reprod 2014;29: 1173-1181.	no relevant intervention
13	Clua E, Tur R, Coroleu B, Rodríguez I, Boada M, Gómez MJ, Barri PN, Veiga A. Is it justified to transfer two embryos in oocyte donation? A pilot randomized clinical trial. Reprod Biomed Online 2015;31: 154-161.	frozen, oocyte donation, d3 Not relevant for this PICO
14	Colaci DS, Afeiche M, Gaskins AJ, Wright DL, Toth TL, Tanrikut C, Hauser R, Chavarro JE. Men's body mass index in relation to embryo quality and clinical outcomes in couples undergoing in vitro fertilization. Fertil Steril 2012;98: 1193-1199.e1191.	Small sample number
15	Copperman AB, Selick CE, Grunfeld L, Sandler B, Bustillo M. Cumulative number and morphological score of embryos resulting in success: realistic expectations from in vitro fertilization-embryo transfer. Fertil Steril 1995;64: 88-92.	Cleavage stage, No relevant population
16	Costa-Borges N, Bellés M, Meseguer M, Galliano D, Ballesteros A, Calderón G. Blastocyst development in single medium with or without renewal on day 3: a prospective cohort study on sibling donor oocytes in a time-lapse incubator. Fertil Steril 2016;105: 707-713.	no relevant intervention
17	Cutting R. Single embryo transfer for all. Best Pract Res Clin Obstet Gynaecol 2018;53: 30-37.	narrative review
18	De Vos A, Van de Velde H, Joris H, Van Steirteghem A. In-vitro matured metaphase-I oocytes have a lower fertilization rate but similar embryo quality as mature metaphase-II oocytes after intracytoplasmic sperm injection. Hum Reprod 1999;14: 1859-1863.	Cleavage stage, No relevant population
19	Delaroche L, Yazbeck C, Gout C, Kahn V, Oger P, Rougier N. Intracytoplasmic morphologically selected sperm injection (IMSI) after repeated IVF or ICSI failures: a prospective comparative study. Eur J Obstet Gynecol Reprod Biol 2013;167: 76-80.	Not relevant for this PICO
20	Déniz FP, Encinas C, Fuente JL. Morphological embryo selection: an elective single embryo transfer proposal. JBRA Assist Reprod 2018;22: 20-25.	Small sample number
21	Dhont M. Single-embryo transfer. Semin Reprod Med 2001;19: 251-258.	narrative review
22	Doherty LF, Martin JR, Kayisli U, Sakkas D, Patrizio P. Fresh transfer outcome predicts the success of a subsequent frozen transfer utilizing blastocysts of the same cohort. Reprod Biomed Online 2014;28: 204-208.	Not SET vs DET
23	Ebner T, Oppelt P, Wöber M, Staples P, Mayer RB, Sonnleitner U, Bulfon-Vogl S, Gruber I, Haid AE, Shebl O. Treatment with Ca2+ ionophore improves embryo development and outcome in cases with previous developmental problems: a prospective multicenter study. Hum Reprod 2015;30: 97-102.	Not relevant for this PICO
24	Ebner T, Tritscher K, Mayer RB, Oppelt P, Duba H-C, Maurer M, Schappacher-Tilp G, Petek E, Shebl O. Quantitative and qualitative trophectoderm grading allows for prediction of live birth and gender. Journal of assisted reproduction and genetics 2016;33: 49-57.	Not relevant for this PICO
25	Ebner T, Yaman C, Moser M, Sommergruber M, Pölz W, Tews G. Embryo fragmentation in vitro and its impact on treatment and pregnancy outcome. Fertil Steril 2001;76: 281-285.	Cleavage stage, No relevant population
26	Elgindy E, Elsedeek MS-E-A. Day 5 expanded blastocysts transferred on same day have comparable outcome to those left for more extended culture and transferred on day 6. Journal of assisted reproduction and genetics 2012;29: 1111-1115.	Not relevant for this PICO
27	Fauque P, Jouannet P, Davy C, Guibert J, Viallon V, Epelboin S, Kunstmann J-M, Patrat C. Cumulative results including obstetrical and neonatal outcome of fresh and frozen-thawed cycles in elective single versus double fresh embryo transfers. Fertil Steril 2010;94: 927-935.	Cleavage stage, No relevant population
28	Fong CY, Bongso A, Ng SC, Kumar J, Trounson A, Ratnam S. Blastocyst transfer after enzymatic treatment of the zona pellucida: improving in-vitro fertilization and understanding implantation. Hum Reprod 1998;13: 2926-2932.	Not relevant for this PICO
29	Frydman N, Madoux S, Hesters L, Duvernoy C, Feyereisen E, Le Du A, Tachdjian G, Frydman R, Fanchin R. A randomized double-blind controlled study on the efficacy of laser zona pellucida thinning on live birth rates in cases of advanced female age. Hum Reprod 2006;21: 2131-2135.	Cleavage stage, No relevant population
30	Fujimoto A, Morishima K, Harada M, Hirata T, Osuga Y, Fujii T. Elective single-embryo transfer improves cumulative pregnancy outcome in young patients but not in women of advanced reproductive age. Journal of assisted reproduction and genetics 2015;32: 1773-1779.	Cleavage stage, No relevant population
31	Gardner DK, Lane M, Stevens J, Schlenker T, Schoolcraft WB. Blastocyst score affects implantation and pregnancy outcome: towards a single blastocyst transfer. Fertil Steril 2000;73: 1155-1158.	Not SET vs DET
32	Gatimel N, Ladj M, Teston C, Lesourd F, Fajau C, Cohade C, Parinaud J, Léandri RD. How many embryos should be transferred? A validated score to predict ongoing implantation rate. Eur J Obstet Gynecol Reprod Biol 2017;212: 30-36.	Cleavage stage, no relevant population
33	Gelo N, Kirinec G, Baldani DP, Vrčić H, Ježek D, Milošević M, Stanić P. Influence of human embryo cultivation in a classic CO2 incubator with 20% oxygen versus benchtop incubator with 5% oxygen on live births: the randomized prospective trial. Zygote 2019;27: 131-136.	Not relevant for this PICO
34	Gerris J. Single-embryo transfer versus multiple-embryo transfer. Reprod Biomed Online 2009;18 Suppl 2: 63-70.	Cleavage stage, no relevant population
35	Guerif F, Bidault R, Gasnier O, Couet ML, Gervereau O, Lansac J, Royere D. Efficacy of blastocyst transfer after implantation failure. Reprod Biomed Online 2004;9: 630-636.	Not relevant for this PICO

36	Guerif F, Frapsauce C, Chavez C, Cadoret V, Royere D. Treating women under 36 years old without top-quality embryos on day 2: a prospective study comparing double embryo transfer with single blastocyst transfer. Hum Reprod 2011;26: 775-781.	No relevant population, BT vs CST
37	Guerif F, Le Gouge A, Giraudeau B, Poindron J, Bidault R, Gasnier O, Royere D. Limited value of morphological assessment at days 1 and 2 to predict blastocyst development potential: a prospective study based on 4042 embryos. Hum Reprod 2007;22: 1973-1981.	Not relevant for this PICO
38	Guerif F, Lemseffer M, Blanchard M, Royere D. Top quality embryos at day 2: a prerequisite for single blastocyst transfer? An observational cohort study in women under 36. Journal of assisted reproduction and genetics 2009;26: 443-449.	Not relevant for this PICO
39	Guerif F, Lemseffer M, Leger J, Bidault R, Cadoret V, Chavez C, Gasnier O, Saussereau MH, Royere D. Does early morphology provide additional selection power to blastocyst selection for transfer? Reprod Biomed Online 2010;21: 510-519.	Not relevant for this PICO
40	Guo N, Yang F, Liu Q, Ren X, Zhao H, Li Y, Ai J. Effects of cumulus cell removal time during in vitro fertilization on embryo quality and pregnancy outcomes: a prospective randomized sibling-oocyte study. Reprod Biol Endocrinol 2016;14: 18-18.	Cleavage stage, no relevant population
41	Han EJ, Kim SK, Lee JR, Jee BC, Suh CS, Kim SH. Multiple pregnancy after single or multiple embryo transfer performed according to Korean guidelines. Clin Exp Reprod Med 2015;42: 169-174.	No relevant population
42	Hara T, Katsuki T, Kusuda T, Ohama K. Pregnancy rate, multiple pregnancy rate, and embryo quality: Clues for single blastocyst transfer from double blastocyst transfer in an unselected population. Reprod Med Biol 2005;4: 153-160.	Not SET vs DET
43	Hasson J, Tulandi T, Son W-Y, Al Ma'mari Na, Badeghiesh A, Tannus S, Takefman J, Shavit T. Reproductive outcomes of familial oocyte donation. Fertil Steril 2016;106: 1696-1702.	Cryo, oocyte donation
44	Hatırnaz S, Hatırnaz E, Dahan MH, Tan SL, Ozer A, Kanat-Pektas M, Ata B. Is elective single-embryo transfer a viable treatment policy in in vitro maturation cycles? Fertil Steril 2016;106: 1691-1695.	Cleavage stage, no relevant population
45	Healy MW, Yamasaki M, Patounakis G, Richter KS, Devine K, DeCherney AH, Hill MJ. The slow growing embryo and premature progesterone elevation: compounding factors for embryo-endometrial asynchrony. Hum Reprod 2017;32: 362-367.	Not relevant for this PICO
46	Heitmann RJ, Hill MJ, Richter KS, DeCherney AH, Widra EA. The simplified SART embryo scoring system is highly correlated to implantation and live birth in single blastocyst transfers. Journal of assisted reproduction and genetics 2013;30: 563-567.	Only SET
47	Hellberg D, Blennborn M, Nilsson S. Defining women who are prone to have twins in in vitro fertilization--a necessary step towards single embryo transfer. Journal of assisted reproduction and genetics 2005;22: 199-206.	Cleavage stage
48	Herbemont C, Sarandi S, Boujenah J, Cedrin-Durnerin I, Sermondade N, Vivot A, Poncelet C, Grynberg M, Sifer C. Should we consider day-2 and day-3 embryo morphology before day-5 transfer when blastocysts reach a similar good quality? Reprod Biomed Online 2017;35: 521-528.	Not relevant for this PICO
49	Hill MJ, Richter KS, Heitmann RJ, Graham JR, Tucker MJ, DeCherney AH, Browne PE, Levens ED. Trophectoderm grade predicts ooutcomes of single-blastocyst transfers. Fertil Steril 2013;99: 1283-1289.e1281.	Not relevant for this PICO
50	Hill MJ, Richter KS, Heitmann RJ, Lewis TD, DeCherney AH, Graham JR, Widra E, Levy MJ. Number of supernumerary vitrified blastocysts is positively correlated with implantation and live birth in single-blastocyst embryo transfers. Fertil Steril 2013;99: 1631-1636.	Only SET
51	Hill MJ, Royster GDt, Healy MW, Richter KS, Levy G, DeCherney AH, Levens ED, Suthar G, Widra E, Levy MJ. Are good patient and embryo characteristics protective against the negative effect of elevated progesterone level on the day of oocyte maturation? Fertil Steril 2015;103: 1477-1484.e1845.	Not relevant for this PICO
52	Hu X, Luo Y, Huang K, Li Y, Xu Y, Zhou C, Mai Q. New Perspectives on Criteria for the Determination of HCG Trigger Timing in GnRH Antagonist Cycles. Medicine (Baltimore) 2016;95: e3691-e3691.	Cleavage stage, no relevant population
53	Jackson KV, Ginsburg ES, Hornstein MD, Rein MS, Clarke RN. Multinucleation in normally fertilized embryos is associated with an accelerated ovulation induction response and lower implantation and pregnancy rates in in vitro fertilization-embryo transfer cycles. Fertil Steril 1998;70: 60-66.	Cleavage stage, no relevant population
54	Janny L, Menezo YJ. Maternal age effect on early human embryonic development and blastocyst formation. Mol Reprod Dev 1996;45: 31-37.	Not relevant for this PICO
55	Jinno M, Katsumata Y, Hoshiai T, Nakamura Y, Matsumoto K, Yoshimura Y. A therapeutic role of prolactin supplementation in ovarian stimulation for in vitro fertilization: the bromocriptine-rebound method. J Clin Endocrinol Metab 1997;82: 3603-3611.	Not relevant for this PICO
56	Kasterstein E, Strassburger D, Komarovsky D, Bern O, Komsky A, Raziel A, Friedler S, Ron-El R. The effect of two distinct levels of oxygen concentration on embryo development in a sibling oocyte study. Journal of assisted reproduction and genetics 2013;30: 1073-1079.	Cleavage stage, no relevant population
57	Keane KN, Yovich JL, Hamidi A, Hinchliffe PM, Dhaliwal SS. Single-centre retrospective analysis of growth hormone supplementation in IVF patients classified as poor-prognosis. BMJ Open 2017;7: e018107-e018107.	Irrelevant
58	Kovacic B, Vlaisavljevic V, Reljic M, Cizek-Sajko M. Developmental capacity of different morphological types of day 5 human morulae and blastocysts. Reprod Biomed Online 2004;8: 687-694.	Not relevant for this PICO
59	Lahoud R, Kwik M, Ryan J, Al-Jefout M, Foley J, Illingworth P. Elevated progesterone in GnRH agonist down regulated in vitro fertilisation (IVFICSI) cycles reduces live birth rates but not embryo quality. Archives of gynecology and obstetrics 2012;285: 535-540.	Cleavage stage, no relevant population
60	Lee S-H, Park CW, Cheon Y-P, Lim CK. Potential of testicular sperm to support embryonic development to the blastocyst stage is comparable to that of ejaculated sperm. Journal of assisted reproduction and genetics 2018;35: 1103-1111.	Not relevant for this PICO
61	Li J, Du M, Zhang Z, Guan Y, Wang X, Zhang X, Liu J, Pan Z, Wang B, Liu W. Does a poor-quality embryo have an adverse impact on a good-quality embryo when transferred together? J Ovarian Res 2018;11: 78-78.	Cleavage stage, no relevant population
62	Li M, Yin M, Wu L, Yan Z, Lyu Q, Yan Z, Li B. Pregnancy and neonatal outcomes of morphologically grade CC blastocysts: are they of clinical value? Arch Gynecol Obstet 2020;302: 1511-1521.	Not relevant for this PICO

63	Li Y, Yang W, Chen X, Li L, Zhang Q, Yang D. Comparison between follicular stimulation and luteal stimulation protocols with clomiphene and HMG in women with poor ovarian response. Gynecol Endocrinol 2016;32: 74-77.	Cleavage stage, no relevant population
64	Lin W-Q, Yao L-N, Zhang D-X, Zhang W, Yang X-J, Yu R. The predictive value of anti-Mullerian hormone on embryo quality, blastocyst development, and pregnancy rate following in vitro fertilization-embryo transfer (IVF-ET). Journal of assisted reproduction and genetics 2013;30: 649-655.	Cleavage stage, no relevant population
65	Lind T, Holte J, Olofsson JI, Hadziosmanovic N, Gudmundsson J, Nedstrand E, Lood M, Berglund L, Rodriguez-Wallberg K. Reduced live-birth rates after IVF/ICSI in women with previous unilateral oophorectomy: results of a multicentre cohort study. Hum Reprod 2018;33: 238-247.	Not relevant for this PICO
66	Luke B. Pregnancy and birth outcomes in couples with infertility with and without assisted reproductive technology: with an emphasis on US population-based studies. Am J Obstet Gynecol 2017;217: 270-281.	Not relevant for this PICO
67	Luke B, Brown MB, Stern JE, Jindal SK, Racowsky C, Ball GD. Using the Society for Assisted Reproductive Technology Clinic Outcome System morphological measures to predict live birth after assisted reproductive technology. Fertil Steril 2014;102: 1338-1344.	Not relevant for this PICO
68	Luke B, Brown MB, Wantman E, Stern JE, Baker VL, Widra E, Coddington CC, 3rd, Gibbons WE, Ball GD. A prediction model for live birth and multiple births within the first three cycles of assisted reproductive technology. Fertil Steril 2014;102: 744-752.	Not relevant for this PICO
69	Maheshwari A, Hamilton M, Bhattacharya S. Should we be promoting embryo transfer at blastocyst stage? Reprod Biomed Online 2016;32: 142-146.	Review on promoting BT
70	Majumdar G, Majumdar A. A prospective randomized study to evaluate the effect of hyaluronic acid sperm selection on the intracytoplasmic sperm injection outcome of patients with unexplained infertility having normal semen parameters. Journal of assisted reproduction and genetics 2013;30: 1471-1475.	Cleavage stage, no relevant population
71	Martikainen H, Tiitinen A, Tomás C, Tapanainen J, Orava M, Tuomivaara L, Vilska S, Hydén-Granskog C, Hovatta O, Finnish ETSG. One versus two embryo transfer after IVF and ICSI: a randomized study. Hum Reprod 2001;16: 1900-1903.	Cleavage stage, no relevant population
72	Martin C, Chang J, Boulet S, Jamieson DJ, Kissin D. Factors predicting double embryo implantation following double embryo transfer in assisted reproductive technology: implications for elective single embryo transfer. Journal of assisted reproduction and genetics 2016;33: 1343-1353.	Not SET vs DET
73	Matorras R, Otero B, Mendoza R, Expósito A, De Pablo JL, Larreategui Z, Ayerdi F, Matorras F. Quality of additional embryos transferred on pregnancy outcomes in IVF: predictions using a mathematical approach. Reprod Biomed Online 2014;29: 200-208.	Cleavage stage, no relevant population
74	Mayer RB, Shebl O, Oppelt P, Reiter E, Altmann R, Enengl S, Allerstorfer C, Ebner T. Good-quality blastocysts derived from vacuolized morulas show reduced viability. Fertil Steril 2018;109: 1025-1029.	Not relevant for this PICO
75	Medicine ASIR, Embryology ESIG. Istanbul consensus workshop on embryo assessment: proceedings of an expert meeting. Reprod Biomed Online 2011;22: 632-646.	No Transfers, Not relevant for this PICO
76	Men CJ, Bormann CL, Walsh BW, Racowsky C. Is the presence of an uncleaved embryo on day 3 a useful predictor of outcomes following day 5 transfer? Journal of assisted reproduction and genetics 2015;32: 1379-1384.	Not relevant for this PICO
77	Mercader A, Garcia-Velasco JA, Escudero E, Remohí J, Pellicer A, Simón C. Clinical experience and perinatal outcome of blastocyst transfer after coculture of human embryos with human endometrial epithelial cells: a 5-year follow-up study. Fertil Steril 2003;80: 1162-1168.	Not SET vs DET
78	Mersereau J, Stanhiser J, Coddington C, Jones T, Luke B, Brown MB. Patient and cycle characteristics predicting high pregnancy rates with single-embryo transfer: an analysis of the Society for Assisted Reproductive Technology outcomes between 2004 and 2013. Fertil Steril 2017;108: 750-756.	Not SET vs DET
79	Minasi MG, Colasante A, Riccio T, Ruberti A, Casciani V, Scarselli F, Spinella F, Fiorentino F, Varricchio MT, Greco E. Correlation between aneuploidy, standard morphology evaluation and morphokinetic development in 1730 biopsied blastocysts: a consecutive case series study. Hum Reprod 2016;31: 2245-2254.	Not SET vs DET
80	Morbeck DE. Blastocyst culture in the Era of PGS and Freeze Alls: Is a 'C' a failing grade? Human reproduction open 2017;2017: hox017.	Not relevant for this PICO
81	Mullin CM, Fino ME, Talebian S, Krey LC, Licciardi F, Grifo JA. Comparison of pregnancy outcomes in elective single blastocyst transfer versus double blastocyst transfer stratified by age. Fertil Steril 2010;93: 1837-1843.	More recent study included
82	Murber A, Fancsovits P, Ledó N, Szakács M, Rigó J, Urbancsek J. Impact of highly purified versus recombinant follicle stimulating hormone on oocyte quality and embryo development in intracytoplasmic sperm injection cycles. Acta Biol Hung 2011;62: 255-264.	Irrelevant
83	Neubourg DD, Mangelschots K, Van Royen E, Vercruyssen M, Ryckaert G, Valkenburg M, Barudy-Vasquez J, Gerris J. Impact of patients' choice for single embryo transfer of a top quality embryo versus double embryo transfer in the first IVF/ICSI cycle. Hum Reprod 2002;17: 2621-2625.	Cleavage stage
84	Niinimäki M, Veleva Z, Martikainen H. Embryo quality is the main factor affecting cumulative live birth rate after elective single embryo transfer in fresh stimulation cycles. Eur J Obstet Gynecol Reprod Biol 2015;194: 131-135.	Cleavage stage
85	Noyes N, Hampton BS, Berkeley A, Licciardi F, Grifo J, Krey L. Factors useful in predicting the success of oocyte donation: a 3-year retrospective analysis. Fertil Steril 2001;76: 92-97.	frozen, oocyte donation, cleavage stage
86	Otsuki J, Iwasaki T, Katada Y, Sato H, Furuhashi K, Tsuji Y, Matsumoto Y, Shiotani M. Grade and looseness of the inner cell mass may lead to the development of monochorionic diamniotic twins. Fertil Steril 2016;106: 640-644.	Not SET vs DET
87	Oyesanya OA, Olufowobi O, Ross W, Sharif K, Afnan M. Prognosis of oocyte donation cycles: a prospective comparison of the in vitro fertilization-embryo transfer cycles of recipients who used shared oocytes versus those who used altruistic donors. Fertil Steril 2009;92: 930-936.	cryo, cleavage stage
88	Pallinger E, Bognar Z, Bodis J, Csabai T, Farkas N, Godony K, Varnagy A, Buzas E, Szekeres-Bartho J. A simple and rapid flow cytometry-based assay to identify a competent embryo prior to embryo transfer. Sci Rep 2017;7: 39927-39927.	Irrelevant

89	Papanikolaou EG, D'Haeseleer E, Verheyen G, Van de Velde H, Camus M, Van Steirteghem A, Devroey P, Tournaye H. Live birth rate is significantly higher after blastocyst transfer than after cleavage-stage embryo transfer when at least four embryos are available on day 3 of embryo culture. A randomized prospective study. Hum Reprod 2005;20: 3198-3203.	Not SET vs DET
90	Papanikolaou EG, Kolibianakis EM, Tournaye H, Venetis CA, Fatemi H, Tarlatzis B, Devroey P. Live birth rates after transfer of equal number of blastocysts or cleavage-stage embryos in IVF. A systematic review and meta-analysis. Hum Reprod 2008;23: 91-99.	Not STE vs DET
91	Park Y-S, Kim MK, Lim CK, Lee S-H, Park D-W, Seo JT, Yang KM. Efficacy of cryopreservation of embryos generated by intracytoplasmic sperm injection with spermatozoa from frozen testicular tissue. Journal of assisted reproduction and genetics 2014;31: 1331-1336.	No relevant population
92	Parsanezhad ME, Jahromi BN, Rezaee S, Kooshesh L, Alaee S. The effect of four different gonadotropin protocols on oocyte and embryo quality and pregnancy outcomes in IVF/ICSI cycles; a randomized controlled trial. Iranian journal of medical sciences 2017;42: 57-65.	Cleavage stage, no relevant population
93	Qu F, Wang FF, Wu Y, Zhou J, Robinson N, Hardiman PJ, Pan JX, He YJ, Zhu YH, Wang HZ et al. Transcutaneous Electrical Acupoint Stimulation Improves the Outcomes of In Vitro Fertilization: a Prospective, Randomized and Controlled Study. Explore (new york, NY) 2017;13: 306-312.	Not relevant for this PICO
94	Quea G, Romero K, Garcia-Velasco JA. Extended embryo culture to increase implantation rate. Reprod Biomed Online 2007;14: 375-383.	Not relevant for this PICO
95	Raziel A, Friedler S, Strassburger D, Komarovsky D, Kasterstein E, Ron-el R. Reproductive performance of patients undergoing intracytoplasmic sperm injection with 100% implantation rate. Journal of assisted reproduction and genetics 2000;17: 379-384.	Cleavage stage, no relevant population
96	Reynolds MA, Schieve LA, Jeng G, Peterson HB, Wilcox LS. Risk of multiple birth associated with in vitro fertilization using donor eggs. Am J Epidemiol 2001;154: 1043-1050.	Not relevant for this PICO
97	Roberts SA, Fitzgerald CT, Brison DR. Modelling the impact of single embryo transfer in a national health service IVF programme. Hum Reprod 2009;24: 122-131.	Cleavage stage, no relevant population
98	Roberts SA, Hirst WM, Brison DR, Vail A, toward SETc. Embryo and uterine influences on IVF outcomes: an analysis of a UK multi-centre cohort. Hum Reprod 2010;25: 2792-2802.	Cleavage stage, no relevant population
99	Rodriguez-Purata J, Gingold J, Lee J, Whitehouse M, Slifkin R, Briton-Jones C, Copperman A, Sandler B. Hatching status before embryo transfer is not correlated with implantation rate in chromosomally screened blastocysts. Hum Reprod 2016;31: 2458-2470.	Not relevant for this PICO
100	Rodriguez-Purata J, Lee J, Whitehouse M, Duke M, Grunfeld L, Sandler B, Copperman A, Mukherjee T. Reproductive outcome is optimized by genomic embryo screening, vitrification, and subsequent transfer into a prepared synchronous endometrium. Journal of assisted reproduction and genetics 2016;33: 401-412.	No relevant population
101	Sarkar P, Gandhi A, Plosker S, Ying Y, Mayer J, Imudia AN. Does supraphysiologic estradiol level during IVF have any effect on oocyte/embryo quality? A sibling embryo cohort analysis of fresh and subsequent frozen embryo transfer. Minerva Ginecol 2018;70: 716-723.	No relevant population
102	Sato W, Fukuda J, Kanamori K, Kawamura K, Kumagai J, Kodama H, Tanaka T. Evaluation of possible criteria for elective single embryo transfer. Reprod Med Biol 2010;9: 107-113.	Cleavage stage, No relevant population
103	Schieve LA, Peterson HB, Meikle SF, Jeng G, Danel I, Burnett NM, Wilcox LS. Live-birth rates and multiple-birth risk using in vitro fertilization. JAMA 1999;282: 1832-1838.	Cleavage stage, No relevant population
104	Setti PEL, Cavagna M, Albani E, Morreale G, Novara PV, Cesana A, Parini V. Outcome of assisted reproductive technologies after different embryo transfer strategies. Reprod Biomed Online 2005;11: 64-70.	Cleavage stage, No relevant population
105	Shahine LK, Lamb JD, Lathi RB, Milki AA, Langen E, Westphal LM. Poor prognosis with in vitro fertilization in Indian women compared to Caucasian women despite similar embryo quality. PLoS One 2009;4: e7599-e7599.	Not relevant for this PICO
106	Shebl O, Ebner T, Sommergruber M, Sir A, Tews G. Cryopreserved blastocysts have a lower implantation but an equal live birth rate as compared to fresh blastocysts of the same quality - a case-control study. Acta Obstet Gynecol Scand 2009;88: 944-947.	No relevant population
107	Shulman A, Ben-Nun I, Ghetler Y, Kaneti H, Shilon M, Beyth Y. Relationship between embryo morphology and implantation rate after in vitro fertilization treatment in conception cycles. Fertil Steril 1993;60: 123-126.	Cleavage stage, No relevant population
108	Simopoulou M, Sfakianoudis K, Antoniou N, Maziotis E, Rapani A, Bakas P, Anifandis G, Kalampokas T, Bolaris S, Pantou A et al. Making IVF more effective through the evolution of prediction models: is prognosis the missing piece of the puzzle? Syst Biol Reprod Med 2018;64: 305-323.	Not relevant for this PICO
109	Styer AK, Luke B, Vitek W, Christianson MS, Baker VL, Christy AY, Polotsky AJ. Factors associated with the use of elective single-embryo transfer and pregnancy outcomes in the United States, 2004-2012. Fertil Steril 2016;106: 80-89.	Only SET
110	Styer AK, Wright DL, Wolkovich AM, Veiga C, Toth TL. Single-blastocyst transfer decreases twin gestation without affecting pregnancy outcome. Fertil Steril 2008;89: 1702-1708.	Only SET
111	Su Y, Li J-J, Wang C, Haddad G, Wang W-H. Aneuploidy analysis in day 7 human blastocysts produced by in vitro fertilization. Reprod Biol Endocrinol 2016;14: 20-20.	Irrelevant
112	Sunde A. Significant reduction of twins with single embryo transfer in IVF. Reprod Biomed Online 2007;15 Suppl 3: 28-34.	Irrelevant
113	Teranishi A, Kuwata A, Fumino T, Hamai H, Shigeta M. A theoretical model for single blastocyst transfer. Journal of assisted reproduction and genetics 2009;26: 327-334.	Not relevant for this PICO
114	Tiitinen A. Single embryo transfer: Why and how to identify the embryo with the best developmental potential. Best Pract Res Clin Endocrinol Metab 2019;33: 77-88.	Narrative review
115	Tomazevic T, Korosec S, Virant Klun I, Drobnic S, Verdenik I. Age, oestradiol and blastocysts can predict success in natural cycle IVF-embryo transfer. Reprod Biomed Online 2007;15: 220-226.	Not relevant for this PICO

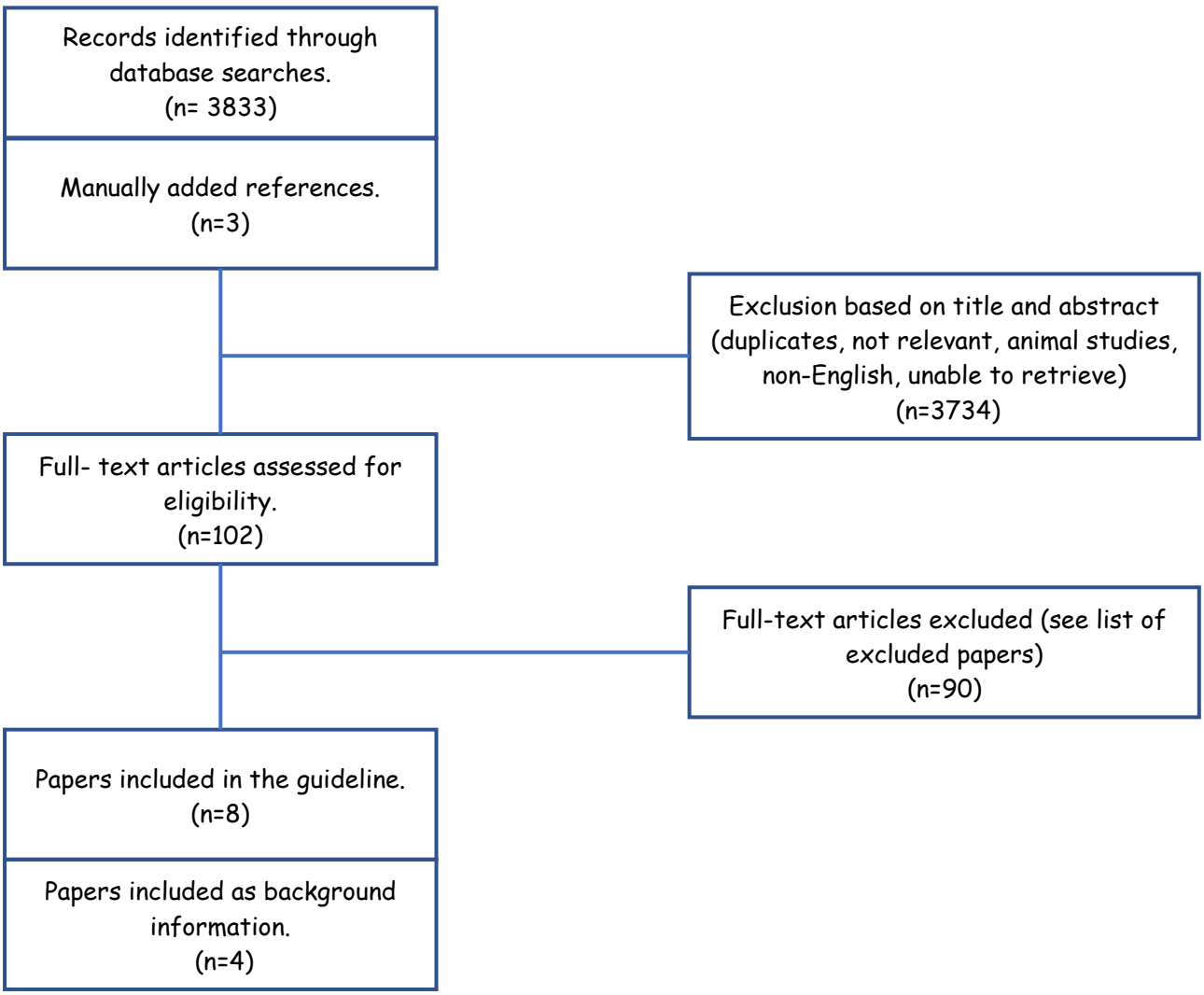
116	Urman B, Balaban B, Yakin K, Isiklar A. Outcome of blastocyst transfer according to availability of excess blastocysts suitable for cryopreservation. Reprod Biomed Online 2003;7: 587-592.	Not SET vs DET
117	Van den Abbeel E, Balaban B, Ziebe S, Lundin K, Cuesta MJ, Klein BM, Helmgaard L, Arce JC. Association between blastocyst morphology and outcome of single-blastocyst transfer. Reprod Biomed Online 2013;27: 353-361.	Only SET
118	Van Heertum K, Somkuti S, Nichols J, Schinfeld J, Sobel M, Barmat L. Randomized Controlled Trial of Autologous Endometrial Coculture Versus Traditional in Vitro Fertilization. J Reprod Med 2017;62: 329-332.	Irrelevant
119	Veleva Z, Orava M, Nuojua-Huttunen S, Tapanainen JS, Martikainen H. Factors affecting the outcome of frozen-thawed embryo transfer. Hum Reprod 2013;28: 2425-2431.	Not SET vs DET
120	Vergouw CG, Botros LL, Judge K, Henson M, Roos P, Kostelijk EH, Schats R, Twisk JWR, Hompes PGA, Sakkas D et al. Non-invasive viability assessment of day-4 frozen-thawed human embryos using near infrared spectroscopy. Reprod Biomed Online 2011;23: 769-776.	Not relevant for this PICO
121	Vergouw CG, Heymans MW, Hardarson T, Sfontouris IA, Economou KA, Ahlström A, Rogberg L, Lainas TG, Sakkas D, Kieslinger DC et al. No evidence that embryo selection by near-infrared spectroscopy in addition to morphology is able to improve live birth rates: results from an individual patient data meta-analysis. Hum Reprod 2014;29: 455-461.	Not relevant for this PICO
122	Vergouw CG, Kieslinger DC, Kostelijk EH, Botros LL, Schats R, Hompes PG, Sakkas D, Lambalk CB. Day 3 embryo selection by metabolomic profiling of culture medium with near-infrared spectroscopy as an adjunct to morphology: a randomized controlled trial. Hum Reprod 2012;27: 2304-2311.	Not relevant for this PICO
123	Vlaisavljevic V, Dmitrovic R, Sajko MC. Should the practice of double blastocyst transfer be abandoned? A retrospective analysis. Reprod Biomed Online 2008;16: 677-683.	fresh embryo transfer
124	Waldenström U, Engström A-B, Hellberg D, Nilsson S. Low-oxygen compared with high-oxygen atmosphere in blastocyst culture, a prospective randomized study. Fertil Steril 2009;91: 2461-2465.	Not relevant for this PICO
125	Wang X, Zhang Z, Tao H, Liu J, Hopyan S, Sun Y. Characterizing Inner Pressure and Stiffness of Trophoblast and Inner Cell Mass of Blastocysts. Biophysical journal 2018;115: 2443-2450.	Not relevant for this PICO
126	Wilson M, Hartke K, Kiehl M, Rodgers J, Brabec C, Lyles R. Transfer of blastocysts and morulae on day 5. Fertil Steril 2004;82: 327-333.	Not SET vs DET
127	Wintner EM, Hershko-Klement A, Tzadikevitch K, Ghetler Y, Gonen O, Wintner O, Shulman A, Wiser A. Does the transfer of a poor quality embryo together with a good quality embryo affect the In Vitro Fertilization (IVF) outcome? J Ovarian Res 2017;10: 2-2.	No relevant population
128	Wirleitner B, Schuff M, Stecher A, Murtinger M, Vanderzwalmen P. Pregnancy and birth outcomes following fresh or vitrified embryo transfer according to blastocyst morphology and expansion stage, and culturing strategy for delayed development. Hum Reprod 2016;31: 1685-1695.	Not SET vs DET
129	Xu Y, Nisenblat V, Lu C, Li R, Qiao J, Zhen X, Wang S. Pretreatment with coenzyme Q10 improves ovarian response and embryo quality in low-prognosis young women with decreased ovarian reserve: a randomized controlled trial. Reprod Biol Endocrinol 2018;16: 29-29.	Not relevant for this PICO
130	Xu Z, Meng L, Pan C, Chen X, Huang X, Yang H. Does oral contraceptives pretreatment affect the pregnancy outcome in polycystic ovary syndrome women undergoing ART with GnRH agonist protocol? Gynecol Endocrinol 2019;35: 124-127.	Not relevant for this PICO
131	Yeh JS, Steward RG, Dude AM, Shah AA, Goldfarb JM, Muasher SJ. Pregnancy rates in donor oocyte cycles compared to similar autologous in vitro fertilization cycles: an analysis of 26,457 fresh cycles from the Society for Assisted Reproductive Technology. Fertil Steril 2014;102: 399-404.	Oocyte donation, Not relevant for this PICO
132	Yetkinel S, Kilicdag EB, Aytac PC, Haydardedeoglu B, Simsek E, Cok T. Effects of the microfluidic chip technique in sperm selection for intracytoplasmic sperm injection for unexplained infertility: a prospective, randomized controlled trial. Journal of assisted reproduction and genetics 2019;36: 403-409.	Cleavage stage, no relevant population
133	Yu Y, Xi Q, Pan Y, Jiang Y, Zhang H, Li L, Liu R. Pregnancy and Neonatal Outcomes in Azoospermic Men After Intracytoplasmic Sperm Injection Using Testicular Sperm and Donor Sperm. Med Sci Monit 2018;24: 6968-6974.	Cleavage stage, no relevant population
134	Zavy MT, Craig LB, Wild RA, Kahn SN, O'Leary D, Hansen KR. In high responding patients undergoing an initial IVF cycle, elevated estradiol on the day of hCG has no effect on live birth rate. Reprod Biol Endocrinol 2014;12: 119-119.	Not relevant for this PICO
135	Zhan Q, Ye Z, Clarke R, Rosenwaks Z, Zaninovic N. Direct Unequal Cleavages: Embryo Developmental Competence, Genetic Constitution and Clinical Outcome. PLoS One 2016;11: e0166398-e0166398.	Not relevant for this PICO
136	Zhang B, Meng Y, Jiang X, Liu C, Zhang H, Cui L, Chen Z-J. IVF outcomes of women with discrepancies between age and serum anti-Müllerian hormone levels. Reprod Biol Endocrinol 2019;17: 58-58.	Cleavage stage, no relevant population
137	Zhao H, Tao W, Li M, Liu H, Wu K, Ma S. Comparison of two protocols of blastocyst biopsy submitted to preimplantation genetic testing for aneuploidies: a randomized controlled trial. Archives of gynecology and obstetrics 2019.	PGD, not relevant for this PICO
138	Zhu D, Zhang J, Cao S, Zhang J, Heng BC, Huang M, Ling X, Duan T, Tong GQ. Vitrified-warmed blastocyst transfer cycles yield higher pregnancy and implantation rates compared with fresh blastocyst transfer cycles--time for a new embryo transfer strategy? Fertil Steril 2011;95: 1691-1695.	Not SET vs DET

PICO 16: In FET, should embryo criteria be considered a factor in deciding to apply DET instead of SET at cleavage-stage for couples/individuals undergoing ART? If yes, which criteria are appropriate?

Search strings

PUBMED	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade” OR “ embryo morphology” OR “ embryo quality”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))
COCHRANE	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Assou S, Haouzi D, De Vos J, Hamamah S. Human cumulus cells as biomarkers for embryo and pregnancy outcomes. Mol Hum Reprod 2010;16: 531-538.	relevant patients and intervention are not included; relevant outcomes are not assessed (basic research)
2	Boostanfar R, Gates D, Guan Y, Gordon K, McCrary Sisk C, Stegmann BJ. Efficacy and safety of frozen-thawed embryo transfer in women aged 35 to 42 years from the PURSUE randomized clinical trial. Fertil Steril 2016;106: 300-305.e305.	relevant intervention is not included (no DET vs eSET)
3	Braude P. Selecting the 'best' embryos: prospects for improvement. Reprod Biomed Online 2013;27: 644-653.	relevant patients and intervention are not included; relevant outcomes are not assessed (review)
4	Burks H, Buckbinder J, Francis-Hernandez M, Chung K, Jabara S, Bendikson K, Paulson R. Developmentally delayed cleavage-stage embryos maintain comparable implantation rates in frozen embryo transfers. J Assist Reprod Genet 2015;32: 1477-1481.	relevant intervention is not included (no DET vs eSET)
5	Clua E, Tur R, Coroleu B, Rodríguez I, Boada M, Gómez MJ, Barri PN, Veiga A. Is it justified to transfer two embryos in oocyte donation? A pilot randomized clinical trial. Reprod Biomed Online 2015;31: 154-161.	Included in the donor oocytes chapter
6	Coates A, Kung A, Mounts E, Hesla J, Bankowski B, Barbieri E, Ata B, Cohen J, Munné S. Optimal euploid embryo transfer strategy, fresh versus frozen, after preimplantation genetic screening with next generation sequencing: a randomized controlled trial. Fertil Steril 2017;107: 723-730.e723.	relevant patients are not included (fresh vs frozen)

7	Cobo A, de los Santos MJ, Castellò D, Gámiz P, Campos P, Remohí J. Outcomes of vitrified early cleavage-stage and blastocyst-stage embryos in a cryopreservation program: evaluation of 3,150 warming cycles. Fertil Steril 2012;98: 1138-1146.e1131.	relevant intervention is not included (no DET vs eSET)
8	Cutting R. Single embryo transfer for all. Best Pract Res Clin Obstet Gynaecol 2018;53: 30-37.	relevant patients and intervention are not included; relevant oucomes are not assessed (review)
9	de los Santos MJ, Arroyo G, Busquet A, Calderón G, Cuadros J, Hurtado de Mendoza MV, Moragas M, Herrer R, Ortiz A, Pons C et al. A multicenter prospective study to assess the effect of early cleavage on embryo quality, implantation, and live-birth rate. Fertil Steril 2014;101: 981-987.	relevant patients and intervention are not included (only fresh, no DET vs eSET)
10	Debrock S, Peeraer K, Fernandez Gallardo E, De Neubourg D, Spiessens C, D'Hooghe TM. Vitrification of cleavage stage day 3 embryos results in higher live birth rates than conventional slow freezing: a RCT. Hum Reprod 2015;30: 1820-1830.	relevant intervention is not included (no DET vs eSET, vitr vs slow) BUT it may be useful
11	Debrock S, Peeraer K, Spiessens C, Willemen D, De Loecker P, D'Hooghe TM. The effect of modified quarter laser-assisted zona thinning on the implantation rate per embryo in frozen/vitrified-thawed/warmed embryo transfer cycles: a prospective randomized controlled trial. Hum Reprod 2011;26: 1997-2007.	relevant intervention is not included (no DET vs eSET)
12	Desai NN, Goldberg JM, Austin C, Falcone T. The new Rapid-i carrier is an effective system for human embryo vitrification at both the blastocyst and cleavage stage. Reprod Biol Endocrinol 2013;11: 41-41.	relevant intervention is not included (no DET vs eSET)
13	Dhont M. Single-embryo transfer. Semin Reprod Med 2001;19: 251-258.	relevant patients are not included (only fresh)
14	Ertzeid G, Storeng R, Tanbo T, Dale PO, Bjercke S, Abyholm T. Cycle characteristics of day 3 embryo transfers with 4-cell embryos only. J Assist Reprod Genet 2003;20: 352-357.	relevant patients and intervention are not included (only fresh, no DET vs eSET)
15	Fauque P, Jouannet P, Davy C, Guibert J, Viallon V, Epelboin S, Kunstmann J-M, Patrat C. Cumulative results including obstetrical and neonatal outcome of fresh and frozen-thawed cycles in elective single versus double fresh embryo transfers. Fertil Steril 2010;94: 927-935.	Included in fresh cleavage stage transfer chapter
16	Gerris J. Single-embryo transfer versus multiple-embryo transfer. Reprod Biomed Online 2009;18 Suppl 2: 63-70.	relevant patients and intervention are not included; relevant outcomes are not assessed (review)
17	Groenewoud ER, Cohlen BJ, Al-Oraiby A, Brinkhuis EA, Broekmans FJM, de Bruin J-P, van Dool G, Fleisher K, Friederich J, Goddijn M et al. Influence of endometrial thickness on pregnancy rates in modified natural cycle frozen-thawed embryo transfer. Acta Obstet Gynecol Scand 2018;97: 808-815.	relevant patients and intervention are not included (endometrial thick)
18	Guo H, Wang Y, Chen Q, Chai W, Lv Q, Kuang Y. Effect of Natural Cycle Endometrial Preparation for Frozen-Thawed Embryo Transfer in Patients with Advanced Endometriosis. Med Sci Monit 2016;22: 4596-4603.	relevant intervention is not included (no DET vs eSET)
19	Guo L, Luo C, Quan S, Chen L, Li H, Guo Y, Han Z, Ou X. The outcome of different post-thawed culture period in frozen-thawed embryo transfer cycle. J Assist Reprod Genet 2013;30: 1589-1594.	relevant intervention is not included (no DET vs eSET)
20	Guo N, Yang F, Liu Q, Ren X, Zhao H, Li Y, Ai J. Effects of cumulus cell removal time during in vitro fertilization on embryo quality and pregnancy outcomes: a prospective randomized sibling-oocyte study. Reprod Biol Endocrinol 2016;14: 18-18.	relevant patients are not included (no frozen)
21	Hatırnaz S, Hatırnaz E, Dahan MH, Tan SL, Ozer A, Kanat-Pektas M, Ata B. Is elective single-embryo transfer a viable treatment policy in in vitro maturation cycles? Fertil Steril 2016;106: 1691-1695.	relevant patients are not included (only fresh)
22	Herrero L, Pareja S, Aragonés M, Cobo A, Bronet F, Garcia-Velasco JA. Oocyte versus embryo vitrification for delayed embryo transfer: an observational study. Reprod Biomed Online 2014;29: 567-572.	relevant intervention is not included (oocyte vs embryo; no DET vs eSET)
23	Hofmann GE, Bentzien F, Bergh PA, Garrisi GJ, Williams MC, Guzman I, Navot D. Premature luteinization in controlled ovarian hyperstimulation has no adverse effect on oocyte and embryo quality. Fertil Steril 1993;60: 675-679.	relevant patients and intervention are not included (progesterone pattern)
24	Jackson KV, Ginsburg ES, Hornstein MD, Rein MS, Clarke RN. Multinucleation in normally fertilized embryos is associated with an accelerated ovulation induction response and lower implantation and pregnancy rates in in vitro fertilization-embryo transfer cycles. Fertil Steril 1998;70: 60-66.	relevant patients are not included (only fresh)
25	Jin R, Tong X, Wu L, Luo L, Luan H, Zhou G, Johansson L, Liu Y. Extended culture of vitrified-warmed embryos in day-3 embryo transfer cycles: a randomized controlled pilot study. Reprod Biomed Online 2013;26: 384-392.	relevant intervention is not included (no DET vs eSET)

26	Jinno M, Katsumata Y, Hoshiai T, Nakamura Y, Matsumoto K, Yoshimura Y. A therapeutic role of prolactin supplementation in ovarian stimulation for in vitro fertilization: the bromocriptine-rebound method. J Clin Endocrinol Metab 1997;82: 3603-3611.	relevant patients are not included (only fresh)
27	Joint S-C. Guidelines for the number of embryos to transfer following in vitro fertilization No. 182, September 2006. Int J Gynaecol Obstet 2008;102: 203-216.	relevant patients and intervention are not included; relevant oucomes are not assessed
28	Kaser DJ, Missmer SA, Correia KF, Ceyhan ST, Hornstein MD, Racowsky C. Predictors of twin live birth following cryopreserved double embryo transfer on day 3. J Assist Reprod Genet 2013;30: 1023-1030.	relevant intervention is not included (no DET vs eSET) BUT it might be useful
29	Keane KN, Yovich JL, Hamidi A, Hinchliffe PM, Dhaliwal SS. Single-centre retrospective analysis of growth hormone supplementation in IVF patients classified as poor-prognosis. BMJ Open 2017;7: e018107-e018107.	relevant patients are not included (only fresh)
30	Koch J, Costello MF, Chapman MG, Kilani S. Twice-frozen embryos are no detriment to pregnancy success: a retrospective comparative study. Fertil Steril 2011;96: 58-62.	relevant intervention is not included (no DET vs eSET)
31	Kyrou D, Fatemi HM, Blockeel C, Stoop D, Albuarki H, Verheyen G, Devroey P. Transfer of cryopreserved - thawed embryos in hCG induced natural or clomiphene citrate cycles yields similar live birth rates in normo-ovulatory women. J Assist Reprod Genet 2010;27: 683-689.	relevant intervention is not included (no DET vs eSET)
32	Lahav-Baratz S, Koifman M, Shiloh H, Ishai D, Wiener-Megnazi Z, Dirnfeld M. Analyzing factors affecting the success rate of frozen-thawed embryos. J Assist Reprod Genet 2003;20: 444-448.	relevant intervention is not included (no DET vs eSET)
33	Lind T, Holte J, Olofsson JI, Hadziosmanovic N, Gudmundsson J, Nedstrand E, Lood M, Berglund L, Rodriguez-Wallberg K. Reduced live-birth rates after IVF/ICSI in women with previous unilateral oophorectomy: results of a multicentre cohort study. Hum Reprod 2018;33: 238-247.	relevant patients and intervention are not included (fresh+frozen; no DET vs eSET)
34	Liu Q, Lian Y, Huang J, Ren X, Li M, Lin S, Liu P, Qiao J. The safety of long-term cryopreservation on slow-frozen early cleavage human embryos. J Assist Reprod Genet 2014;31: 471-475.	relevant intervention is not included (no DET vs eSET)
35	Luke B. Pregnancy and birth outcomes in couples with infertility with and without assisted reproductive technology: with an emphasis on US population-based studies. Am J Obstet Gynecol 2017;217: 270-281.	relevant patients are not included
36	Lundin K, Bergh C. Cumulative impact of adding frozen-thawed cycles to single versus double fresh embryo transfers. Reprod Biomed Online. Jul;15(1):76-82.	No relevant population
37	Marren AJ, Tan YY, de Vries BS, Ng CHM, Livingstone M, Bowman MC. Use of the CryoPredict algorithm to predict live birth from cryopreserved embryos. Aust N Z J Obstet Gynaecol 2016;56: 260-266.	relevant patients are not included (only blastocyst)
38	Martikainen H, Tiitinen A, Tomás C, Tapanainen J, Orava M, Tuomivaara L, Vilska S, Hydén-Granskog C, Hovatta O, Finnish ETSG. One versus two embryo transfer after IVF and ICSI: a randomized study. Hum Reprod 2001;16: 1900-1903.	no relevant population
39	Matorras R, Otero B, Mendoza R, Expósito A, De Pablo JL, Larreategui Z, Ayerdi F, Matorras F. Quality of additional embryos transferred on pregnancy outcomes in IVF: predictions using a mathematical approach. Reprod Biomed Online 2014;29: 200-208.	relevant patients are not included (only fresh)
40	Medicine ASIR, Embryology ESIG. Istanbul consensus workshop on embryo assessment: proceedings of an expert meeting. Reprod Biomed Online 2011;22: 632-646.	relevant patients and intervention are not included; relevant outcomes are not assessed (consensus)
41	Mersereau J, Stanhiser J, Coddington C, Jones T, Luke B, Brown MB. Patient and cycle characteristics predicting high pregnancy rates with single-embryo transfer: an analysis of the Society for Assisted Reproductive Technology outcomes between 2004 and 2013. Fertil Steril 2017;108: 750-756.	No relevant population
42	Mesut N, Ciray HN, Mesut A, Aksoy T, Bahceci M. Cryopreservation of blastocysts is the most feasible strategy in good responder patients. Fertil Steril 2011;96: 1121-1125.e1121.	relevant intervention is not included (no DET vs eSET)
43	Min JK, Hughes E, Young D, Joint Sogc-Cfas Clinical Practice Guidelines C, Reproductive E, Infertility C. Elective single embryo transfer following in vitro fertilization. J Obstet Gynaecol Can 2010;32: 363-377.	relevant patients and intervention are not included; relevant outcomes are not assessed
44	Murber A, Fancsovits P, Ledó N, Szakács M, Rigó J, Urbancsek J. Impact of highly purified versus recombinant follicle stimulating hormone on oocyte quality and embryo development in intracytoplasmic sperm injection cycles. Acta Biol Hung 2011;62: 255-264.	relevant patients are not included (only fresh)
45	Noyes N, Hampton BS, Berkeley A, Licciardi F, Grifo J, Krey L. Factors useful in predicting the success of oocyte donation: a 3-year retrospective analysis. Fertil Steril 2001;76: 92-97.	relevant patients are not included (only fresh)
46	O'Shea LC, Hughes C, Kirkham C, Mocanu EV. The impact of blastomere survival rates on developmental competence of cryo-thawed Day 2 embryos. Eur J Obstet Gynecol Reprod Biol 2016;197: 98-102.	relevant intervention is not included (no DET vs eSET)

47	Oyesanya OA, Cheng WS, Quah EM, Cheng WC. Outcome of cryopreservation and subsequent programmed replacement of frozen-thawed embryos in an in vitro fertilisation programme: preliminary report and proposals for improvement. Ann Acad Med Singapore 1992;21: 471-475.	No relevant population
48	Oyesanya OA, Olufowobi O, Ross W, Sharif K, Afnan M. Prognosis of oocyte donation cycles: a prospective comparison of the in vitro fertilization-embryo transfer cycles of recipients who used shared oocytes versus those who used altruistic donors. Fertil Steril 2009;92: 930-936.	relevant patients are not included (only fresh)
49	Park Y-S, Kim MK, Lim CK, Lee S-H, Park D-W, Seo JT, Yang KM. Efficacy of cryopreservation of embryos generated by intracytoplasmic sperm injection with spermatozoa from frozen testicular tissue. J Assist Reprod Genet 2014;31: 1331-1336.	relevant intervention is not included (TESE vs t-TESE; no DET vs eSET)
50	Paulson RJ. Hormonal induction of endometrial receptivity. Fertil Steril 2011;96: 530-535.	relevant patients and intervention are not included; relevant outcomes are not assessed (review)
51	Rama Raju GA, Haranath GB, Krishna KM, Prakash GJ, Madan K. Vitrification of human 8-cell embryos, a modified protocol for better pregnancy rates. Reprod Biomed Online 2005;11: 434-437.	No relevant population: Frozen cycles
52	Rama Raju GA, Jaya Prakash G, Murali Krishna K, Madan K. Neonatal outcome after vitrified day 3 embryo transfers: a preliminary study. Fertil Steril 2009;92: 143-148.	relevant intervention is not included (vitr vs slow; no DET vs eSET)
53	Rhenman A, Berglund L, Brodin T, Olovsson M, Milton K, Hadziosmanovic N, Holte J. Which set of embryo variables is most predictive for live birth? A prospective study in 6252 single embryo transfers to construct an embryo score for the ranking and selection of embryos. Hum Reprod 2015;30: 28-36.	relevant intervention is not included (fresh vs vitr; no DET vs eSET)
54	Riggs R, Mayer J, Dowling-Lacey D, Chi T-F, Jones E, Oehninger S. Does storage time influence postthaw survival and pregnancy outcome? An analysis of 11,768 cryopreserved human embryos. Fertil Steril 2010;93: 109-115.	relevant patients are not included (only fresh)
55	Roberts SA, Fitzgerald CT, Brison DR. Modelling the impact of single embryo transfer in a national health service IVF programme. Hum Reprod 2009;24: 122-131.	relevant intervention is not included (storage time; no DET vs eSET)
56	Roberts SA, Hirst WM, Brison DR, Vail A, toward SETc. Embryo and uterine influences on IVF outcomes: an analysis of a UK multi-centre cohort. Hum Reprod 2010;25: 2792-2802.	relevant patients are not included (only fresh)
57	Roberts SA, McGowan L, Vail A, Brison DR. The use of single embryo transfer to reduce the incidence of twins: Implications and questions for practice from the 'towardSET?' project. Hum Fertil (Camb) 2011;14: 89-96.	relevant patients are not included
58	Rodriguez-Purata J, Lee J, Whitehouse M, Duke M, Grunfeld L, Sandler B, Copperman A, Mukherjee T. Reproductive outcome is optimized by genomic embryo screening, vitrification, and subsequent transfer into a prepared synchronous endometrium. J Assist Reprod Genet 2016;33: 401-412.	relevant patients are not included
59	Safari S, Khalili MA, Barekati Z, Halvaei I, Anvari M, Nottola SA. Cosmetic micromanipulation of vitrified-warmed cleavage stage embryos does not improve ART outcomes: An ultrastructural study of fragments. Reprod Biol 2017;17: 210-217.	relevant patients are not included (only blastocyst)
60	Sarkar P, Gandhi A, Plosker S, Ying Y, Mayer J, Imudia AN. Does supraphysiologic estradiol level during IVF have any effect on oocyte/embryo quality? A sibling embryo cohort analysis of fresh and subsequent frozen embryo transfer. Minerva Ginecol 2018;70: 716-723.	relevant intervention is not included (no DET vs eSET)
61	Sato W, Fukuda J, Kanamori K, Kawamura K, Kumagai J, Kodama H, Tanaka T. Evaluation of possible criteria for elective single embryo transfer. Reprod Med Biol 2010;9: 107-113.	Not SET vs DET
62	Seikkula J, Ahinko K, Polo-Kantola P, Anttila L, Hurme S, Tinkanen H, Jokimaa V. Mid-luteal phase gonadotropin-releasing hormone agonist support in frozen-thawed embryo transfers during artificial cycles: A prospective interventional pilot study. J Gynecol Obstet Hum Reprod 2018;47: 391-395.	relevant patients are not included (only fresh)
63	Seikkula J, Oksjoki S, Hurme S, Mankonen H, Polo-Kantola P, Jokimaa V. Pregnancy and perinatal outcomes after transfer of binucleated or multinucleated frozen-thawed embryos: a case-control study. Reprod Biomed Online 2018;36: 607-613.	relevant intervention is not included (no DET vs eSET)
64	Selick CE, Hofmann GE, Albano C, Horowitz GM, Copperman AB, Garrisi GJ, Navot D. Embryo quality and pregnancy potential of fresh compared with frozen embryos--is freezing detrimental to high quality embryos? Hum Reprod 1995;10: 392-395.	relevant intervention is not included (no DET vs eSET)
65	Simopoulou M, Sfakianoudis K, Antoniou N, Maziotis E, Rapani A, Bakas P, Anifandis G, Kalampokas T, Bolaris S, Pantou A et al. Making IVF more effective through the evolution of prediction models: is prognosis the missing piece of the puzzle? Syst Biol Reprod Med 2018;64: 305-323.	relevant patients are not included (fresh vs frozen)
66	Stern JE, Lieberman ES, Macaluso M, Racowsky C. Is cryopreservation of embryos a legitimate surrogate marker of embryo quality in studies of assisted reproductive technology conducted using national databases? Fertil Steril 2012;97: 890-893.	relevant patients and intervention are not included; relevant outcomes are not assessed (review)
67	Sunde A. Significant reduction of twins with single embryo transfer in IVF. Reprod Biomed Online 2007;15 Suppl 3: 28-34.	relevant intervention is not included (no DET vs eSET)
68	Tiitinen A, Halttunen M, Härkki P, Vuoristo P, Hyden-Granskog C. Elective single embryo transfer: the value of cryopreservation. Hum Reprod 2001;16: 1140-1144.	No relevant population

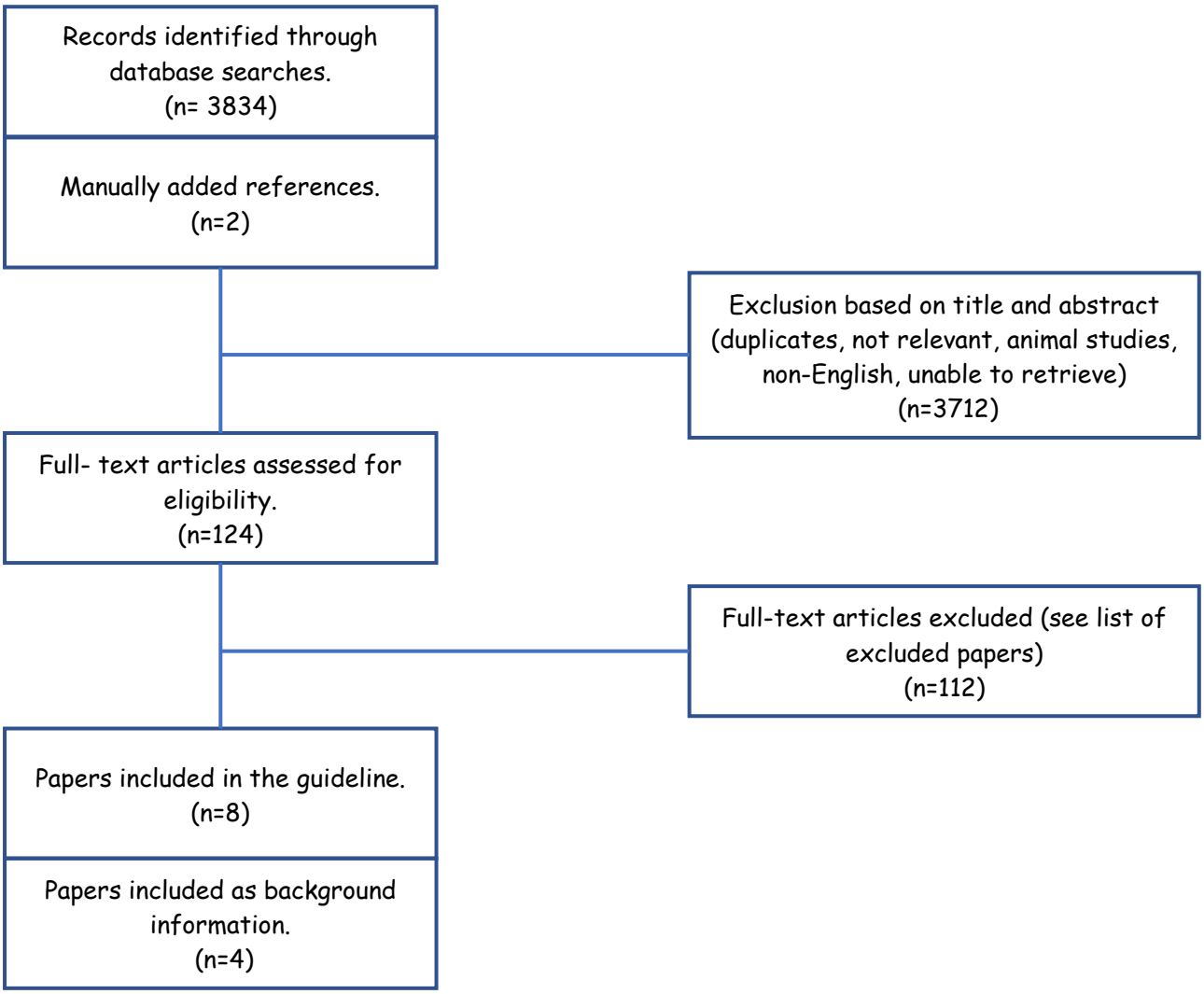
69	Van den Abbeel E, Camus M, Van Waesberghe L, Devroey P, Van Steirteghem AC. Viability of partially damaged human embryos after cryopreservation. Hum Reprod 1997;12: 2006-2010.	No relevant intervention
70	Van der Elst J, Camus M, Van den Abbeel E, Maes R, Devroey P, Van Steirteghem AC. Prospective randomized study on the cryopreservation of human embryos with dimethylsulfoxide or 1,2-propanediol protocols. Fertil Steril 1995;63: 92-100.	relevant outcomes are not assessed (only CPR)
71	Van der Elst J, Van den Abbeel E, Vitrier S, Camus M, Devroey P, Van Steirteghem AC. Selective transfer of cryopreserved human embryos with further cleavage after thawing increases delivery and implantation rates. Hum Reprod 1997;12: 1513-1521.	relevant intervention is not included (no DET vs eSET)
72	van Montfoort APA, Dumoulin JCM, Land JA, Coonen E, Derhaag JG, Evers JLH. Elective single embryo transfer (eSET) policy in the first three IVF/ICSI treatment cycles. Hum Reprod 2005;20: 433-436.	relevant intervention is not included (no DET vs eSET)
73	Vanhoutte L, De Sutter P, Van der Elst J, Dhont M. Clinical benefit of metaphase I oocytes. Reprod Biol Endocrinol 2005;3: 71-71.	relevant outcomes are not assessed (only ongoing pregnancy)
74	Veleva Z, Orava M, Nuojua-Huttunen S, Tapanainen JS, Martikainen H. Factors affecting the outcome of frozen-thawed embryo transfer. Hum Reprod 2013;28: 2425-2431.	relevant patients are not included
75	Vergouw CG, Heymans MW, Hardarson T, Sfontouris IA, Economou KA, Ahlström A, Rogberg L, Lainas TG, Sakkas D, Kieslinger DC et al. No evidence that embryo selection by near-infrared spectroscopy in addition to morphology is able to improve live birth rates: results from an individual patient data meta-analysis. Hum Reprod 2014;29: 455-461.	Not relevant for this PICO
76	Vilska S, Tiitinen A, Hydén-Granskog C, Hovatta O. Elective transfer of one embryo results in an acceptable pregnancy rate and eliminates the risk of multiple birth. Hum Reprod 1999;14: 2392-2395.	relevant patients and intervention are not included (metanalysis)
77	Wang H, Ou Z, Chen Z, Yang L, Sun L. Influence of different post-thaw culture time on the clinical outcomes of different quality embryos. Adv Clin Exp Med 2019;28: 523-527.	relevant patients are not included
78	Wang X-l, Zhang X, Qin Y-q, Hao D-y, Shi H-r. Outcomes of day 3 embryo transfer with vitrification using Cryoleaf: a 3-year follow-up study. J Assist Reprod Genet 2012;29: 883-889.	relevant intervention is not included (no DET vs eSET)
79	Wintner EM, Hershko-Klement A, Tzadikevitch K, Ghetler Y, Gonen O, Wintner O, Shulman A, Wiser A. Does the transfer of a poor-quality embryo together with a good quality embryo affect the In Vitro Fertilization (IVF) outcome? J Ovarian Res 2017;10: 2-2.	No relevant population
80	Wong JYY, Wong AYK. Phasing-in of vitrification into routine practice: why, how, and what. Hong Kong Med J 2011;17: 119-126.	relevant patients are not included (only fresh)
81	Wu L, Han W, Wang J, Zhang X, Liu W, Xiong S, Han S, Liu J, Gao Y, Huang G. Embryo culture using a time-lapse monitoring system improves live birth rates compared with a conventional culture system: a prospective cohort study. Hum Fertil (Camb) 2018;21: 255-262.	relevant intervention is not included (slow vs vitr; no DET vs eSET)
82	Wu L, Han W, Zhang X, Wang J, Liu W, Xiong S, Huang G. A retrospective analysis of morphokinetic parameters according to the implantation outcome of IVF treatment. Eur J Obstet Gynecol Reprod Biol 2016;197: 186-190.	relevant patients are not included (only fresh)
83	Wu Y-T, Li C, Zhu Y-M, Zou S-H, Wu Q-F, Wang L-P, Wu Y, Yin R, Shi C-Y, Lin J et al. Outcomes of neonates born following transfers of frozen-thawed cleavage-stage embryos with blastomere loss: a prospective, multicenter, cohort study. BMC Med 2018;16: 96-96.	relevant patients are not included (only fresh)
84	Xu Y, Nisenblat V, Lu C, Li R, Qiao J, Zhen X, Wang S. Pretreatment with coenzyme Q10 improves ovarian response and embryo quality in low-prognosis young women with decreased ovarian reserve: a randomized controlled trial. Reprod Biol Endocrinol 2018;16: 29-29.	relevant intervention is not included (no DET vs eSET)
85	Xu Z, Meng L, Pan C, Chen X, Huang X, Yang H. Does oral contraceptives pretreatment affect the pregnancy outcome in polycystic ovary syndrome women undergoing ART with GnRH agonist protocol? Gynecol Endocrinol 2019;35: 124-127.	relevant patients are not included (only fresh)
86	Zhang B, Meng Y, Jiang X, Liu C, Zhang H, Cui L, Chen Z-J. IVF outcomes of women with discrepancies between age and serum anti-Müllerian hormone levels. Reprod Biol Endocrinol 2019;17: 58-58.	relevant intervention is not included (no DET vs eSET)
87	Zhang XJ, Lv Q, Min LH, Cao XH, Li XJ. Effect of developmental stage of embryos at freezing on live birth outcomes after frozen embryo transfer. Cryo Letters 2017;38: 399-406.	Not SET vs DET
88	Zhou H, Zao W, Zhang W, Shi J, Shi W. No adverse effects were identified on the perinatal outcomes after laser-assisted hatching treatment. Reprod Biomed Online 2014;29: 692-698.	relevant intervention is not included (no DET vs eSET)
89	Zhu H-Y, Xue Y-M, Yang L-Y, Jiang L-Y, Ling C, Tong X-M, Zhang S-Y. Slow freezing should not be totally substituted by vitrification when applied to day 3 embryo cryopreservation: an analysis of 5613 frozen cycles. J Assist Reprod Genet 2015;32: 1371-1377.	relevant intervention is not included (no DET vs eSET)
90	Zhu X, Fu Y. Randomized, Controlled Pilot Study of Low-Dose Human Chorionic Gonadotropin Administration Beginning From the Early Follicular Phase for Women With Polycystic Ovarian Syndrome Undergoing Ovarian Stimulation Using the Progesterone Protocol. Frontiers in endocrinology 2019;10.	relevant intervention is not included (slow vs vitr; DET vs eSET)

PICO 17: In FET, should embryo criteria be considered a factor in deciding to apply DET instead of SET at blastocyst stage for couples/individuals undergoing ART? If yes, which criteria are appropriate?

Search strings

PUBMED	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade” OR “ embryo morphology” OR “ embryo quality”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))
COCHRANE	(“Embryo, Mammalian"[Majr] AND "Embryonic Development"[Mesh] OR Embryogenesis OR “quality embryos” OR “embryo grade”)AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Ahlström A, Westin C, Wikland M, Hardarson T. Prediction of live birth in frozen-thawed single blastocyst transfer cycles by pre-freeze and post-thaw morphology. Hum Reprod 2013;28: 1199-1209.	Predcition model
2	Assou S, Haouzi D, De Vos J, Hamamah S. Human cumulus cells as biomarkers for embryo and pregnancy outcomes. Mol Hum Reprod 2010;16: 531-538.	On cumulus cell markers
3	Azzarello A, Hoest T, Hay-Schmidt A, Mikkelsen AL. Live birth potential of good morphology and vitrified blastocysts presenting abnormal cell divisions. Reprod Biol 2017;17: 144-150.	Timelapse study
4	Boostanfar R, Gates D, Guan Y, Gordon K, McCrary Sisk C, Stegmann BJ. Efficacy and safety of frozen-thawed embryo transfer in women aged 35 to 42 years from the PURSUE randomized clinical trial. Fertil Steril 2016;106: 300-305.e305.	On cumulative data, not frozen SET vs DET
5	Braude P. Selecting the 'best' embryos: prospects for improvement. Reprod Biomed Online 2013;27: 644-653.	No numbers on frozen SET vs DET
6	Cai H, Niringiyumukiza JD, Li Y, Lai Q, Jia Y, Su P, Xiang W. Open versus closed vitrification system of human oocytes and embryos: a systematic review and meta-analysis of embryologic and clinical outcomes. Reprod Biol Endocrinol 2018;16: 123-123.	Outcome is on open vs closed vitrification, not on SET vs DET
7	Cao S, Zhao C, Zhang J, Wu X, Guo X, Ling X. Retrospective clinical analysis of two artificial shrinkage methods applied prior to blastocyst vitrification on the outcome of frozen embryo transfer. J Assist Reprod Genet 2014;31: 577-581.	not relevant for this PICO
8	Chang C-C, Elliott TA, Wright G, Shapiro DB, Toledo AA, Nagy ZP. Prospective controlled study to evaluate laboratory and clinical outcomes of oocyte vitrification obtained in in vitro fertilization patients aged 30 to 39 years. Fertil Steril 2013;99: 1891-1897.	Oocyte vit
9	Cimadomo D, Capalbo A, Levi-Setti PE, Soscia D, Orlando G, Albani E, Parini V, Stoppa M, Dovere L, Tacconi L et al. Associations of blastocyst features, trophectoderm biopsy and other laboratory practice with post-warming behavior and implantation. Hum Reprod 2018;33: 1992-2001.	Not SET vs DET

10	Cimadomo D, Soscia D, Vaiarelli A, Maggiulli R, Capalbo A, Ubaldi FM, Rienzi L. Looking past the appearance: a comprehensive description of the clinical contribution of poor-quality blastocysts to increase live birth rates during cycles with aneuploidy testing. Hum Reprod 2019;34: 1206-1214.	No relevant intervention
11	Clua E, Tur R, Coroleu B, Rodríguez I, Boada M, Gómez MJ, Barri PN, Veiga A. Is it justified to transfer two embryos in oocyte donation? A pilot randomized clinical trial. Reprod Biomed Online 2015;31: 154-161.	Data on frozen is not SET vs DET
12	Coates A, Kung A, Mounts E, Hesla J, Bankowski B, Barbieri E, Ata B, Cohen J, Munné S. Optimal euploid embryo transfer strategy, fresh versus frozen, after preimplantation genetic screening with next generation sequencing: a randomized controlled trial. Fertil Steril 2017;107: 723-730.e723.	Fresh vs frozen, not frozen SET vs DET
13	Cobo A, de los Santos MJ, Castellò D, Gámiz P, Campos P, Remohí J. Outcomes of vitrified early cleavage-stage and blastocyst-stage embryos in a cryopreservation program: evaluation of 3,150 warming cycles. Fertil Steril 2012;98: 1138-1146.e1131.	no relevant intervention
14	Cutting R. Single embryo transfer for all. Best Pract Res Clin Obstet Gynaecol 2018;53: 30-37.	No specific numbers on frozen SET vs DET
15	Debrock S, Peeraer K, Spiessens C, Willemen D, De Loecker P, D'Hooghe TM. The effect of modified quarter laser-assisted zona thinning on the implantation rate per embryo in frozen/vitrified-thawed/warmed embryo transfer cycles: a prospective randomized controlled trial. Hum Reprod 2011;26: 1997-2007.	On hatching
16	Déniz FP, Encinas C, Fuente JL. Morphological embryo selection: an elective single embryo transfer proposal. JBRA Assist Reprod 2018;22: 20-25.	On fresh ET, no relevant population
17	Desai N, Ploskonka S, Goodman L, Attaran M, Goldberg JM, Austin C, Falcone T. Delayed blastulation, multinucleation, and expansion grade are independently associated with live-birth rates in frozen blastocyst transfer cycles. Fertil Steril 2016;106: 1370-1378.	Not SET vs DET
18	Desai NN, Goldberg JM, Austin C, Falcone T. The new Rapid-i carrier is an effective system for human embryo vitrification at both the blastocyst and cleavage stage. Reprod Biol Endocrinol 2013;11: 41-41.	Not relevant for this PICO
19	Dhont M. Single-embryo transfer. Semin Reprod Med 2001;19: 251-258.	on fresh ET, not on frozen
20	Doherty LF, Martin JR, Kayisli U, Sakkas D, Patrizio P. Fresh transfer outcome predicts the success of a subsequent frozen transfer utilizing blastocysts of the same cohort. Reprod Biomed Online 2014;28: 204-208.	Not SET vs DET
21	Ebner T, Tritscher K, Mayer RB, Oppelt P, Duba H-C, Maurer M, Schappacher-Tilp G, Petek E, Shebl O. Quantitative and qualitative trophectoderm grading allows for prediction of live birth and gender. J Assist Reprod Genet 2016;33: 49-57.	Not relevant for this PICO
22	Ebner T, Vanderzwalmen P, Shebl O, Urdl W, Moser M, Zech NH, Tews G. Morphology of vitrified/warmed day-5 embryos predicts rates of implantation, pregnancy and live birth. Reprod Biomed Online 2009;19: 72-78.	Not relevant for this PICO
23	El-Toukhy T, Wharf E, Walavalkar R, Singh A, Bolton V, Khalaf Y, Braude P. Delayed blastocyst development does not influence the outcome of frozen-thawed transfer cycles. BJOG 2011;118: 1551-1556.	Not relevant for this PICO
24	Fauque P, Jouannet P, Davy C, Guibert J, Viallon V, Epelboin S, Kunstmann J-M, Patrat C. Cumulative results including obstetrical and neonatal outcome of fresh and frozen-thawed cycles in elective single versus double fresh embryo transfers. Fertil Steril 2010;94: 927-935.	On fresh ET, not on frozen
25	Ferreux L, Bourdon M, Sallem A, Santulli P, Barraud-Lange V, Le Foll N, Maignien C, Chapron C, de Ziegler D, Wolf J-P et al. Live birth rate following frozen-thawed blastocyst transfer is higher with blastocysts expanded on Day 5 than on Day 6. Hum Reprod 2018;33: 390-398.	Not SET vs DET
26	Gerris J. Single-embryo transfer versus multiple-embryo transfer. Reprod Biomed Online 2009;18 Suppl 2: 63-70.	No, on fresh ET, not on frozen
27	Groenewoud ER, Cohlen BJ, Al-Oraiby A, Brinkhuis EA, Broekmans FJM, de Bruin J-P, van Dool G, Fleisher K, Friederich J, Goddijn M et al. Influence of endometrial thickness on pregnancy rates in modified natural cycle frozen-thawed embryo transfer. Acta Obstet Gynecol Scand 2018;97: 808-815.	Not relevant for this PICO
28	Guerif F, Lemseffer M, Blanchard M, Royere D. Top quality embryos at day 2: a prerequisite for single blastocyst transfer? An observational cohort study in women under 36. J Assist Reprod Genet 2009;26: 443-449.	Not SET vs DET
29	Guidelines for the number of embryos to transfer following in vitro fertilization No. 182, September 2006. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics, 2008. 102(2): p. 203-216.	There are some numbers on frozen SET vs DET
30	Guo H, Wang Y, Chen Q, Chai W, Lv Q, Kuang Y. Effect of Natural Cycle Endometrial Preparation for Frozen-Thawed Embryo Transfer in Patients with Advanced Endometriosis. Med Sci Monit 2016;22: 4596-4603.	Not relevant for this PICO
31	Guo L, Luo C, Quan S, Chen L, Li H, Guo Y, Han Z, Ou X. The outcome of different post-thawed culture period in frozen-thawed embryo transfer cycle. J Assist Reprod Genet 2013;30: 1589-1594.	Not relevant for this PICO
32	Guo N, Yang F, Liu Q, Ren X, Zhao H, Li Y, Ai J. Effects of cumulus cell removal time during in vitro fertilization on embryo quality and pregnancy outcomes: a prospective randomized sibling-oocyte study. Reprod Biol Endocrinol 2016;14: 18-18.	Not relevant for this PICO
33	Hasson J, Tulandi T, Son W-Y, Al Ma'mari Na, Badeghiesh A, Tannus S, Takefman J, Shavit T. Reproductive outcomes of familial oocyte donation. Fertil Steril 2016;106: 1696-1702.	Not relevant for this PICO
34	Hatırnaz S, Hatırnaz E, Dahan MH, Tan SL, Ozer A, Kanat-Pektas M, Ata B. Is elective single-embryo transfer a viable treatment policy in in vitro maturation cycles? Fertil Steril 2016;106: 1691-1695.	SET vs DET in fresh IVM
35	Herbemont C, Chekroune S, Bonan S, Cedrin-Durnerin I, Vivot A, Sonigo C, Boujenah J, Grynberg M, Sifer C. Impact of post-warming culture duration on clinical outcomes of vitrified good-quality blastocyst transfers: a prospective randomized study. Fertil Steril 2018;110: 1290-1297.	Not relevant for this PICO
36	Herrero L, Pareja S, Aragonés M, Cobo A, Bronet F, Garcia-Velasco JA. Oocyte versus embryo vitrification for delayed embryo transfer: an observational study. Reprod Biomed Online 2014;29: 567-572.	Not relevant for this PICO

37	Hill MJ, Miller KA, Frattarelli JL. A GnRH agonist and exogenous hormone stimulation protocol has a higher live-birth rate than a natural endogenous hormone protocol for frozen-thawed blastocyst-stage embryo transfer cycles: an analysis of 1391 cycles. Fertil Steril 2010;93: 416-422.	Not SET vs DET
38	Irani M, O'Neill C, Palermo GD, Xu K, Zhang C, Qin X, Zhan Q, Clarke RN, Ye Z, Zaninovic N et al. Blastocyst development rate influences implantation and live birth rates of similarly graded euploid blastocysts. Fertil Steril 2018;110: 95-102.e101.	Not rleevant for this PICO
39	Irani M, Zaninovic N, Rosenwaks Z, Xu K. Does maternal age at retrieval influence the implantation potential of euploid blastocysts? Am J Obstet Gynecol 2019;220: 379.e371-379.e377.	Not SET vs DET
40	Jackson KV, Ginsburg ES, Hornstein MD, Rein MS, Clarke RN. Multinucleation in normally fertilized embryos is associated with an accelerated ovulation induction response and lower implantation and pregnancy rates in in vitro fertilization-embryo transfer cycles. Fertil Steril 1998;70: 60-66.	Not relevant for this PICO
41	Jinno M, Katsumata Y, Hoshiai T, Nakamura Y, Matsumoto K, Yoshimura Y. A therapeutic role of prolactin supplementation in ovarian stimulation for in vitro fertilization: the bromocriptine-rebound method. J Clin Endocrinol Metab 1997;82: 3603-3611.	Not relevant for this PICO
42	Keane KN, Yovich JL, Hamidi A, Hinchliffe PM, Dhaliwal SS. Single-centre retrospective analysis of growth hormone supplementation in IVF patients classified as poor-prognosis. BMJ Open 2017;7: e018107-e018107.	Not relevant for this PICO
43	Koch J, Costello MF, Chapman MG, Kilani S. Twice-frozen embryos are no detriment to pregnancy success: a retrospective comparative study. Fertil Steril 2011;96: 58-62.	1x freezing vs 2x freezing, not SET vs DET
44	Lahav-Baratz S, Koifman M, Shiloh H, Ishai D, Wiener-Megnazi Z, Dirnfeld M. Analyzing factors affecting the success rate of frozen-thawed embryos. J Assist Reprod Genet 2003;20: 444-448.	not relevant for this PICO
45	Lahoud R, Kwik M, Ryan J, Al-Jefout M, Foley J, Illingworth P. Elevated progesterone in GnRH agonist down regulated in vitro fertilisation (IVFICSI) cycles reduces live birth rates but not embryo quality. Arch Gynecol Obstet 2012;285: 535-540.	not relevant for this PICO
46	Le Lannou D, Griveau J-F, Laurent M-C, Gueho A, Veron E, Morcel K. Contribution of embryo cryopreservation to elective single embryo transfer in IVF-ICSI. Reprod Biomed Online 2006;13: 368-375.	No relevant population
47	Liebermann J. Vitrification of human blastocysts: an update. Reprod Biomed Online 2009;19 Suppl 4: 4328-4328.	Not SET vs DET
48	Lind T, Holte J, Olofsson JI, Hadziosmanovic N, Gudmundsson J, Nedstrand E, Lood M, Berglund L, Rodriguez-Wallberg K. Reduced live-birth rates after IVF/ICSI in women with previous unilateral oophorectomy: results of a multicentre cohort study. Hum Reprod 2018;33: 238-247.	Not relevant for this PICO
49	López Regalado ML, Clavero A, Gonzalvo MC, Serrano M, Martínez L, Mozas J, Rodríguez-Serrano F, Fontes J, Romero B, Castilla JA. Cumulative live birth rate after two single frozen embryo transfers (eSFET) versus a double frozen embryo transfer (DFET) with cleavage stage embryos: a retrospective cohort study. J Assist Reprod Genet 2014;31: 1621-1627.	No relevant population
50	Luke B. Pregnancy and birth outcomes in couples with infertility with and without assisted reproductive technology: with an emphasis on US population-based studies. Am J Obstet Gynecol 2017;217: 270-281.	Not relevant (no numbers on frozen ET)
51	Mackenna A, Crosby J, Zegers-Hochschild F. Sibling embryo blastocyst development as a prognostic factor for the outcome of day-3 embryo transfer. Reprod Biomed Online 2013;26: 486-490.	not relevant for this PICO
52	Maheshwari A, Hamilton M, Bhattacharya S. Should we be promoting embryo transfer at blastocyst stage? Reprod Biomed Online 2016;32: 142-146.	NO, on extended culture, not on cryo embryos
53	Marren AJ, Tan YY, de Vries BS, Ng CHM, Livingstone M, Bowman MC. Use of the CryoPredict algorithm to predict live birth from cryopreserved embryos. Aust N Z J Obstet Gynaecol 2016;56: 260-266.	Not relevant for this PICO
54	Martikainen H, Tiitinen A, Tomás C, Tapanainen J, Orava M, Tuomivaara L, Vilska S, Hydén-Granskog C, Hovatta O, Finnish ETSG. One versus two embryo transfer after IVF and ICSI: a randomized study. Hum Reprod 2001;16: 1900-1903.	No relevant population
55	Matorras R, Otero B, Mendoza R, Expósito A, De Pablo JL, Larreategui Z, Ayerdi F, Matorras F. Quality of additional embryos transferred on pregnancy outcomes in IVF: predictions using a mathematical approach. Reprod Biomed Online 2014;29: 200-208.	On fresh ET
56	Medicine ASIR, Embryology ESIG. Istanbul consensus workshop on embryo assessment: proceedings of an expert meeting. Reprod Biomed Online 2011;22: 632-646.	not relevant for this PICO
57	Mersereau J, Stanhiser J, Coddington C, Jones T, Luke B, Brown MB. Patient and cycle characteristics predicting high pregnancy rates with single-embryo transfer: an analysis of the Society for Assisted Reproductive Technology outcomes between 2004 and 2013. Fertil Steril 2017;108: 750-756.	No relevant population
58	Mesut N, Ciray HN, Mesut A, Aksoy T, Bahceci M. Cryopreservation of blastocysts is the most feasible strategy in good responder patients. Fertil Steril 2011;96: 1121-1125.e1121.	On day of cryo not on SET vs DET
59	Murber A, Fancsovits P, Ledó N, Szakács M, Rigó J, Urbancsek J. Impact of highly purified versus recombinant follicle stimulating hormone on oocyte quality and embryo development in intracytoplasmic sperm injection cycles. Acta Biol Hung 2011;62: 255-264.	Study on stimulation not on DET vs SET in frozen
60	Niinimäki M, Veleva Z, Martikainen H. Embryo quality is the main factor affecting cumulative live birth rate after elective single embryo transfer in fresh stimulation cycles. Eur J Obstet Gynecol Reprod Biol 2015;194: 131-135.	On cumulative, not frozen DET vs SET
61	Noyes N, Hampton BS, Berkeley A, Licciardi F, Grifo J, Krey L. Factors useful in predicting the success of oocyte donation: a 3-year retrospective analysis. Fertil Steril 2001;76: 92-97.	not relevant for this PICO
62	Oyesanya OA, Cheng WS, Quah EM, Cheng WC. Outcome of cryopreservation and subsequent programmed replacement of frozen-thawed embryos in an in vitro fertilisation programme: preliminary report and proposals for improvement. Ann Acad Med Singapore 1992;21: 471-475.	Not SET vs DET
63	Oyesanya OA, Olufowobi O, Ross W, Sharif K, Afnan M. Prognosis of oocyte donation cycles: a prospective comparison of the in vitro fertilization-embryo transfer cycles of recipients who used shared oocytes versus those who used altruistic donors. Fertil Steril 2009;92: 930-936.	not relevant for this PICO

64	Ozgur K, Bulut H, Berkkanoglu M, Humaidan P, Coetzee K. Artificial cryopreserved embryo transfer cycle success depends on blastocyst developmental rate and progesterone timing. Reprod Biomed Online 2018;36: 269-276.	Prog admission study
65	Park DS, Kim JW, Eum JH, Lee WS, Yoon TK, Lyu SW. Clinical and pregnancy outcomes of double and single blastocyst transfers related with morphological grades in vitrified-warmed embryo transfer. *Taiwanese journal of obstetrics & gynecology* 2020;59: 398-402.	Same population as Park et al., 2019 included in the guideline
66	Park Y-S, Kim MK, Lim CK, Lee S-H, Park D-W, Seo JT, Yang KM. Efficacy of cryopreservation of embryos generated by intracytoplasmic sperm injection with spermatozoa from frozen testicular tissue. J Assist Reprod Genet 2014;31: 1331-1336.	Not SET vs DET
67	Paulson RJ. Hormonal induction of endometrial receptivity. Fertil Steril 2011;96: 530-535.	Endometrial receptivity not on eSET vs DET
68	Poulain M, Hesters L, Sanglier T, de Bantel A, Fanchin R, Frydman N, Grynberg M. Is it acceptable to destroy or include human embryos before day 5 in research programmes? Reprod Biomed Online 2014;28: 522-529.	Study on capacity of PQE to reach blastocyst stage
69	Quea G, Romero K, Garcia-Velasco JA. Extended embryo culture to increase implantation rate. Reprod Biomed Online 2007;14: 375-383.	Not SET vs DET
70	Richter KS, Bugge KR, Bromer JG, Levy MJ. Relationship between endometrial thickness and embryo implantation, based on 1,294 cycles of in vitro fertilization with transfer of two blastocyst-stage embryos. Fertil Steril 2007;87: 53-59.	Not SET vs DET
71	Richter KS, Ginsburg DK, Shipley SK, Lim J, Tucker MJ, Graham JR, Levy MJ. Factors associated with birth outcomes from cryopreserved blastocysts: experience from 4,597 autologous transfers of 7,597 cryopreserved blastocysts. Fertil Steril 2016;106: 354-362.e352.	not SET vs DET
72	Roberts SA, Fitzgerald CT, Brison DR. Modelling the impact of single embryo transfer in a national health service IVF programme. Hum Reprod 2009;24: 122-131.	no relevant population
73	Roberts SA, Hirst WM, Brison DR, Vail A, toward SETc. Embryo and uterine influences on IVF outcomes: an analysis of a UK multi-centre cohort. Hum Reprod 2010;25: 2792-2802.	Fresh ET, no relevant population
74	Roberts SA, McGowan L, Vail A, Brison DR. The use of single embryo transfer to reduce the incidence of twins: Implications and questions for practice from the 'towardSET?' project. Hum Fertil (Camb) 2011;14: 89-96.	No relevant population
75	Rodriguez-Purata J, Gingold J, Lee J, Whitehouse M, Slifkin R, Briton-Jones C, Copperman A, Sandler B. Hatching status before embryo transfer is not correlated with implantation rate in chromosomally screened blastocysts. Hum Reprod 2016;31: 2458-2470.	not relevant for this PICO
76	Rodriguez-Purata J, Lee J, Whitehouse M, Duke M, Grunfeld L, Sandler B, Copperman A, Mukherjee T. Reproductive outcome is optimized by genomic embryo screening, vitrification, and subsequent transfer into a prepared synchronous endometrium. J Assist Reprod Genet 2016;33: 401-412.	Different comparison than PICO Q13
77	Safari S, Khalili MA, Barekati Z, Halvaei I, Anvari M, Nottola SA. Cosmetic micromanipulation of vitrified-warmed cleavage stage embryos does not improve ART outcomes: An ultrastructural study of fragments. Reprod Biol 2017;17: 210-217.	This is on a lab technique diff, not on SET vs DET
78	Sallem A, Santulli P, Barraud-Lange V, Le Foll N, Ferreux L, Maignien C, Bourdon M, Chapron C, de Ziegler D, Wolf J-P et al. Extended culture of poor-quality supernumerary embryos improves ART outcomes. J Assist Reprod Genet 2018;35: 311-319.	Not SET vs DET
79	Salumets A, Suikkari A-M, Mäkinen S, Karro H, Roos A, Tuuri T. Frozen embryo transfers: implications of clinical and embryological factors on the pregnancy outcome. Hum Reprod 2006;21: 2368-2374.	No relevant population
80	Sarkar P, Gandhi A, Plosker S, Ying Y, Mayer J, Imudia AN. Does supraphysiologic estradiol level during IVF have any effect on oocyte/embryo quality? A sibling embryo cohort analysis of fresh and subsequent frozen embryo transfer. Minerva Ginecol 2018;70: 716-723.	not relevant for this PICO
81	Sato W, Fukuda J, Kanamori K, Kawamura K, Kumagai J, Kodama H, Tanaka T. Evaluation of possible criteria for elective single embryo transfer. Reprod Med Biol 2010;9: 107-113.	On fresh ET
82	Seikkula J, Ahinko K, Polo-Kantola P, Anttila L, Hurme S, Tinkanen H, Jokimaa V. Mid-luteal phase gonadotropin-releasing hormone agonist support in frozen-thawed embryo transfers during artificial cycles: A prospective interventional pilot study. J Gynecol Obstet Hum Reprod 2018;47: 391-395.	Medication study
83	Shebl O, Ebner T, Sommergruber M, Sir A, Tews G. Cryopreserved blastocysts have a lower implantation but an equal live birth rate as compared to fresh blastocysts of the same quality - a case-control study. Acta Obstet Gynecol Scand 2009;88: 944-947.	comparison is fresh vs frozen, not frozen SET vs dET
84	Simopoulou M, Sfakianoudis K, Antoniou N, Maziotis E, Rapani A, Bakas P, Anifandis G, Kalampokas T, Bolaris S, Pantou A et al. Making IVF more effective through the evolution of prediction models: is prognosis the missing piece of the puzzle? Syst Biol Reprod Med 2018;64: 305-323.	On prediction models for implantation
85	Son W-Y, Yoon S-H, Yoon H-J, Lee S-M, Lim J-H. Pregnancy outcome following transfer of human blastocysts vitrified on electron microscopy grids after induced collapse of the blastocoele. Hum Reprod 2003;18: 137-139.	Lab study, not on frozen DET vs SET
86	Sunde A. Significant reduction of twins with single embryo transfer in IVF. Reprod Biomed Online 2007;15 Suppl 3: 28-34.	Primarily on fresh embryo ET
87	Taylor TH, Patrick JL, Gitlin SA, Michael Wilson J, Crain JL, Griffin DK. Outcomes of blastocysts biopsied and vitrified once versus those cryopreserved twice for euploid blastocyst transfer. Reprod Biomed Online 2014;29: 59-64.	PGT study
88	Teranishi A, Kuwata A, Fumino T, Hamai H, Shigeta M. A theoretical model for single blastocyst transfer. J Assist Reprod Genet 2009;26: 327-334.	On fresh embryos
89	Thompson SM, Onwubalili N, Brown K, Jindal SK, McGovern PG. Blastocyst expansion score and trophectoderm morphology strongly predict successful clinical pregnancy and live birth following elective single embryo blastocyst transfer (eSET): a national study. J Assist Reprod Genet 2013;30: 1577-1581.	On fresh embryos

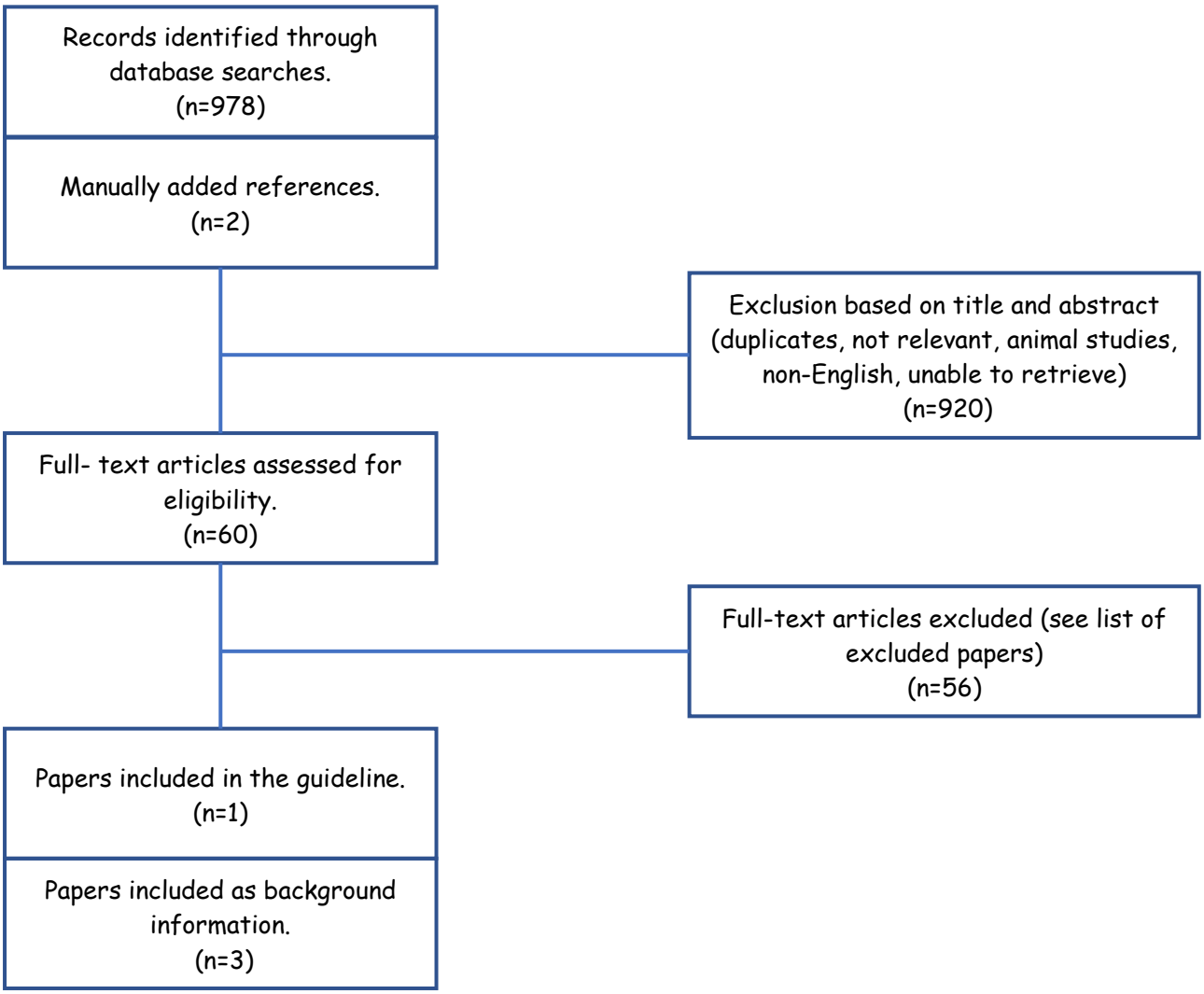
90	Tiitinen A, Halttunen M, Härkki P, Vuoristo P, Hyden-Granskog C. Elective single embryo transfer: the value of cryopreservation. Hum Reprod 2001;16: 1140-1144.	Not SET vs DET
91	Ubaldi FM, Capalbo A, Colamaria S, Ferrero S, Maggiulli R, Vajta G, Sapienza F, Cimadomo D, Giuliani M, Gravotta E et al. Reduction of multiple pregnancies in the advanced maternal age population after implementation of an elective single embryo transfer policy coupled with enhanced embryo selection: pre- and post-intervention study. Hum Reprod 2015;30: 2097-2106.	Not SET vs DET
92	Veleva Z, Orava M, Nuojua-Huttunen S, Tapanainen JS, Martikainen H. Factors affecting the outcome of frozen-thawed embryo transfer. Hum Reprod 2013;28: 2425-2431.	Not relevant for this PICO
93	Vergouw CG, Botros LL, Judge K, Henson M, Roos P, Kostelijk EH, Schats R, Twisk JWR, Hompes PGA, Sakkas D et al. Non-invasive viability assessment of day-4 frozen-thawed human embryos using near infrared spectroscopy. Reprod Biomed Online 2011;23: 769-776.	Metabolic profiling not on eSET vs DET
94	Vergouw CG, Heymans MW, Hardarson T, Sfontouris IA, Economou KA, Ahlström A, Rogberg L, Lainas TG, Sakkas D, Kieslinger DC et al. No evidence that embryo selection by near-infrared spectroscopy in addition to morphology is able to improve live birth rates: results from an individual patient data meta-analysis. Hum Reprod 2014;29: 455-461.	Not relevant for this PICO
95	Wilson M, Hartke K, Kiehl M, Rodgers J, Brabec C, Lyles R. Transfer of blastocysts and morulae on day 5. Fertil Steril 2004;82: 327-333.	On fresh ET, not on frozen
96	Wintner EM, Hershko-Klement A, Tzadikevitch K, Ghetler Y, Gonen O, Wintner O, Shulman A, Wiser A. Does the transfer of a poor-quality embryo together with a good quality embryo affect the In Vitro Fertilization (IVF) outcome? J Ovarian Res 2017;10: 2-2.	On fresh embryo not on frozen, no relevant population
97	Wirleitner B, Schuff M, Stecher A, Murtinger M, Vanderzwalmen P. Pregnancy and birth outcomes following fresh or vitrified embryo transfer according to blastocyst morphology and expansion stage, and culturing strategy for delayed development. Hum Reprod 2016;31: 1685-1695.	On extended culture, not on frozen DET vs SET
98	Wong JYY, Wong AYK. Phasing-in of vitrification into routine practice: why, how, and what. Hong Kong Med J 2011;17: 119-126.	Study is on slow freezing vs vitrification, not on frozen DET vs SET
99	Wu J, Zhang J, Kuang Y, Chen Q, Wang Y. The effect of Day 3 cell number on pregnancy outcomes in vitrified-thawed single blastocyst transfer cycles. Hum Reprod 2020;35: 2478-2487.	No relevant population, no relevant intervention
100	Xiong F, Li G, Sun Q, Wang S, Wan C, Chen P, Yao Z, Zhong H, Zeng Y. Clinical outcomes after transfer of blastocysts derived from frozen-thawed cleavage embryos: a retrospective propensity-matched cohort study. Arch Gynecol Obstet 2019;300: 751-761.	Not SET vs DET
101	Xu Y, Nisenblat V, Lu C, Li R, Qiao J, Zhen X, Wang S. Pretreatment with coenzyme Q10 improves ovarian response and embryo quality in low-prognosis young women with decreased ovarian reserve: a randomized controlled trial. Reprod Biol Endocrinol 2018;16: 29-29.	Not relevant for this PICO
102	Xu Z, Meng L, Pan C, Chen X, Huang X, Yang H. Does oral contraceptives pretreatment affect the pregnancy outcome in polycystic ovary syndrome women undergoing ART with GnRH agonist protocol? Gynecol Endocrinol 2019;35: 124-127.	This study investigated the effect of antioxidant treatment with coenzyme Q10 (CoQ10) on ovarian response -> not PICO
103	Youm HS, Choi J-R, Oh D, Rho YH. Closed versus open vitrification for human blastocyst cryopreservation: A meta-analysis. Cryobiology 2017;77: 64-70.	Open vs closed, note SET vs DET
104	Young D, Klepacka D, McGarvey M, Schoolcraft WB, Katz-Jaffe MG. Infertility patients with chromosome inversions are not susceptible to an inter-chromosomal effect. J Assist Reprod Genet 2019;36: 509-516.	PGT study
105	Yovich JL, Conceicao JL, Stanger JD, Hinchliffe PM, Keane KN. Mid-luteal serum progesterone concentrations govern implantation rates for cryopreserved embryo transfers conducted under hormone replacement. Reprod Biomed Online 2015;31: 180-191.	Not relevant for this PICO
106	Zhang XJ, Lv Q, Min LH, Cao XH, Li XJ. Effect of developmental stage of embryos at freezing on live birth outcomes after frozen embryo transfer. Cryo Letters 2017;38: 399-406.	Not SET vs DET
107	Zhang B, Meng Y, Jiang X, Liu C, Zhang H, Cui L, Chen Z-J. IVF outcomes of women with discrepancies between age and serum anti-Müllerian hormone levels. Reprod Biol Endocrinol 2019;17: 58-58.	Not relevant for this PICO
108	Zhao J, Yan Y, Huang X, Sun L, Li Y. Blastocoele expansion: an important parameter for predicting clinical success pregnancy after frozen-warmed blastocysts transfer. Reprod Biol Endocrinol 2019;17: 15-15.	Not SET vs DET
109	Zhao Y-Y, Yu Y, Zhang X-W. Overall Blastocyst Quality, Trophectoderm Grade, and Inner Cell Mass Grade Predict Pregnancy Outcome in Euploid Blastocyst Transfer Cycles. Chin Med J (Engl) 2018;131: 1261-1267.	No, on EQ and implantation of fresh euploid embryo
110	Zheng X, Chen Y, Yan J, Wu Y, Zhuang X, Lin S, Zhu J, Lian Y, Qiao J, Liu P. Effect of repeated cryopreservation on human embryo developmental potential. Reprod Biomed Online 2017;35: 627-632.	Study on effect of 2x freezing
111	Zhu X, Fu Y. Randomized, Controlled Pilot Study of Low-Dose Human Chorionic Gonadotropin Administration Beginning From the Early Follicular Phase for Women With Polycystic Ovarian Syndrome Undergoing Ovarian Stimulation Using the Progesterone Protocol. Frontiers in endocrinology 2019;10.	Not relevant for this PICO
112	Zhu D, Zhang J, Cao S, Zhang J, Heng BC, Huang M, Ling X, Duan T, Tong GQ. Vitrified-warmed blastocyst transfer cycles yield higher pregnancy and implantation rates compared with fresh blastocyst transfer cycles--time for a new embryo transfer strategy? Fertil Steril 2011;95: 1691-1695.	Not frozen SET vs frozen DET

PICO 18: Can TL morphokinetics be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART? If yes, which criteria and what is the appropriate cut off?

Search strings

PUBMED	("Time-Lapse Imaging"[Mesh] OR “time-lapse” OR “time lapse”) AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”)
COCHRANE	("Time-Lapse Imaging"[Mesh] OR morphokinetic* OR “time-lapse” OR “time lapse”) AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR “embryo transfer strategy” OR “transfer strategies” OR “embryo transfer policy” OR “frozen cycle”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Abeyta M, Behr B. Morphological assessment of embryo viability. Seminars in reproductive medicine 2014;32: 114-126.	Review EQ in general
2	Adamson GD, Abusief ME, Palao L, Witmer J, Palao LM, Gvakharia M. Improved implantation rates of day 3 embryo transfers with the use of an automated time-lapse-enabled test to aid in embryo selection. Fertility and sterility 2016;105: 369-375.e366.	Determines if TL selection improves PR, LBR…on day 3
3	Adolfsson E, Porath S, Andershed AN. External validation of a time-lapse model; a retrospective study comparing embryo evaluation using a morphokinetic model to standard morphology with live birth as endpoint. JBRA assisted reproduction 2018;22: 205-214.	validate a morphokinetic implantation model developed for EmbryoScope on embryos with known outcome, compared to standard morphology in a retrospective single centre study
4	Ahlstrom A, Park H, Bergh C, Selleskog U, Lundin K. Conventional morphology performs better than morphokinetics for prediction of live birth after day 2 transfer. Reproductive biomedicine online 2016;33: 61-70.	assess the ability of patient characteristics and embryo morphology together with morphokinetic variables to predict live birth after day 2 transfer
5	Almagor M, Harir Y, Fieldust S, Or Y, Shoham Z. Ratio between inner cell mass diameter and blastocyst diameter is correlated with successful pregnancy outcomes of single blastocyst transfers. Fertility and sterility 2016;106: 1386-1391.	predict pregnancy outcomes of SET by measuring the ratio of

		inner cell mass (ICM) diameter to blastocyst diameter using time-lapse images
6	Almagor M, Or Y, Fieldust S, Shoham Z. Irregular cleavage of early preimplantation human embryos: characteristics of patients and pregnancy outcomes. Journal of assisted reproduction and genetics 2015;32: 1811-1815.	Effect of direct cleavage and irregular divisions on PR.
7	Azzarello A, Hoest T, Hay-Schmidt A, Mikkelsen AL. Live birth rate and number of blastomeres on day 2 transfer. Journal of assisted reproduction and genetics 2016;33: 1337-1342.	No embryo with PNB earlier than 20 h 45 min resulted in live birth. All six PN scores tested is relevant and TL demonstrate that PN morphology change along the time.
8	Azzarello A, Hoest T, Hay-Schmidt A, Mikkelsen AL. Live birth potential of good morphology and vitrified blastocysts presenting abnormal cell divisions. Reproductive biology 2017;17: 144-150.	LBR of SET of blastocysts with/without abnormal cleavage
9	Azzarello A, Hoest T, Mikkelsen AL. The impact of pronuclei morphology and dynamicity on live birth outcome after time-lapse culture. Human reproduction (Oxford, England) 2012;27: 2649-2657.	LBR, transfer on day, embryo selection based on number of C
10	Barrie A, Homburg R, McDowell G, Brown J, Kingsland C, Troup S. Embryos cultured in a time-lapse system result in superior treatment outcomes: a strict matched pair analysis. Human fertility (Cambridge, England) 2017;20: 179-185.	Same 364 patients having embryos cultured in a St inc vs TL
11	Basile N, Caiazzo M, Meseguer M. What does morphokinetics add to embryo selection and in-vitro fertilization outcomes? Current opinion in obstetrics & gynecology 2015;27: 193-200.	Review of morphokinetics of TL
12	Bjelica A, Subanovic S. ASSESSMENT OF THE EMBRYO QUALITY IN THE PROCEDURE OF IN VITRO FERTILIZATION. Medicinski pregled 2016;69: 241-246.	Review
13	Bodri D, Kato R, Kondo M, Hosomi N, Katsumata Y, Kawachiya S, Matsumoto T. Time-lapse monitoring of zona pellucida-free embryos obtained through in vitro fertilization: a retrospective case series. Fertility and sterility 2015;103: e35.	TL culture oocytes without Zona pellucida that were ok fertilised, developed until Blastocyst, frozen and implanted
14	Bodri D, Milewski R, Yao Serna J, Sugimoto T, Kato R, Matsumoto T, Kawachiya S. Predicting live birth by combining cleavage and blastocyst-stage time-lapse variables using a hierarchical and a data mining-based statistical model. Reproductive biology 2018;18: 355-360.	LBR in 2 models: hierarchical model and data-logistic model
15	Bodri D, Sugimoto T, Yao Serna J, Kawachiya S, Kato R, Matsumoto T. Blastocyst collapse is not an independent predictor of reduced live birth: a time-lapse study. Fertility and sterility 2016;105: 1476-1483.e1473.	Live birth rate decreased progressively between blastocyst collapse groups (36%, 31%, 14%); significantly lower if multiple collapses occurred but this correlation fails when this is corrected in a multivariate analysis
16	Campbell A, Fishel S, Bowman N, Duffy S, Sedler M, Thornton S. Retrospective analysis of outcomes after IVF using an aneuploidy risk model derived from time-lapse imaging without PGS. Reproductive biomedicine online 2013;27: 140-146.	retrospective, previously established three-class aneuploidy risk model applied to embryos with known live birth outcomes
17	Conaghan J. Time-lapse imaging of preimplantation embryos. Seminars in reproductive medicine 2014;32: 134-140.	Review
18	Costa-Borges N, Bellés M, Meseguer M, Galliano D, Ballesteros A, Calderón G. Blastocyst development in single medium with or without renewal on day 3: a prospective cohort study on sibling donor oocytes in a time-lapse incubator. Fertility and sterility 2016;105: 707-713.	Compares two steps vs one single step media culture in TL
19	Dal Canto M, Bartolacci A, Turchi D, Pignataro D, Lain M, De Ponti E, Brigante C, Mignini Renzini M, Buratini J. Faster fertilization and cleavage kinetics reflect competence to achieve a live birth after intracytoplasmic sperm injection, but this association fades with maternal age. Fertility and sterility 2020.	Not SET vs DET
20	Desai N, Gill P. Blastomere cleavage plane orientation and the tetrahedral formation are associated with increased probability of a good-quality blastocyst for cryopreservation or transfer: a time-lapse study. Fertility and sterility 2019;111: 1159-1168.e1151.	same IR depending on plane division
21	Desai N, Ploskonka S, Goodman L, Attaran M, Goldberg JM, Austin C, Falcone T. Delayed blastulation, multinucleation, and expansion grade are independently associated with live-birth rates in frozen blastocyst transfer cycles. Fertility and sterility 2016;106: 1370-1378.	Correlate thawed embryo kinetics with LB
22	Desch L, Bruno C, Luu M, Barberet J, Choux C, Lamotte M, Schmutz E, Sagot P, Fauque P. Embryo multinucleation at the two-cell stage is an independent predictor of intracytoplasmic sperm injection outcomes. Fertility and sterility 2017;107: 97-103.e104.	LBR primary outcome correlated retrospectively with grade of Day 2 multinucleation observed by TL

23	Dirican EK, Olgan S. On the origin of zygosity and chorionicity in twinning: evidence from human in vitro fertilization. Journal of assisted reproduction and genetics 2021.	
24	Ebner T, Oppelt P, Radler E, Allerstorfer C, Habelsberger A, Mayer RB, Shebl O. Morphokinetics of vitrified and warmed blastocysts predicts implantation potential. Journal of assisted reproduction and genetics 2017;34: 239-244.	It was studied whether morphokinetics of blastocoele re-expansion and hatching in vitrified-warmed blastocysts is predictive of implantation, clinical pregnancy, and live birth
25	Ebner T, Sesli Ö, Kresic S, Enengl S, Stoiber B, Reiter E, Oppelt P, Mayer RB, Shebl O, Bolton VN et al. Time-lapse imaging of cytoplasmic strings at the blastocyst stage suggests their association with spontaneous blastocoel collapse. Reproductive biomedicine online 2020;40: 191-199.	Blastocoel strings and morphokinetics and clinical outcomes
26	Eliasen T, Gabrielsen A, Bay B, Iversen L, Knudsen U. Monochorionic twins after single blastocyst transfer: retrospective cohort and blinded time lapse annotation analysis. Reproductive biomedicine online 2021;43: 62-65.	
27	Fishel S, Campbell A, Montgomery S, Smith R, Nice L, Duffy S, Jenner L, Berrisford K, Kellam L, Smith R et al. Time-lapse imaging algorithms rank human preimplantation embryos according to the probability of live birth. Reproductive biomedicine online 2018;37: 304-313.	retrospective. TL algorithm as primary embryo selection for transfer
28	Fishel S, Campbell A, Foad F, Davies L, Best L, Davis N, Smith R, Duffy S, Wheat S, Montgomery S et al. Evolution of embryo selection for IVF from subjective morphology assessment to objective time-lapse algorithms improves chance of live birth. Reproductive biomedicine online 2020;40: 61-70.	Not SET vs DET
29	Gleicher N, Kushnir VA, Barad DH. Is it time for a paradigm shift in understanding embryo selection? Reproductive biology and endocrinology : RB&E 2015;13: 3.	Review
30	Grøndahl ML, Tharin JE, Maroun LL, Stener Jørgensen F. Conjoined twins after single blastocyst transfer: a case report including detailed time-lapse recording of the earliest embryogenesis, from zygote to expanded blastocyst. Human reproduction (Oxford, England) 2022;37: 718-724.	Not SET vs DET
31	Guo YH, Liu Y, Qi L, Song WY, Jin HX. Can Time-Lapse Incubation and Monitoring Be Beneficial to Assisted Reproduction Technology Outcomes? A Randomized Controlled Trial Using Day 3 Double Embryo Transfer. Frontiers in physiology 2021;12: 794601.	Not SET vs DET
32	Haikin Herzberger E, Ghetler Y, Tamir Yaniv R, Berkovitz A, Gonen O, Cohen I, Shulman A, Wiser A. Time lapse microscopy is useful for elective single-embryo transfer. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2016;32: 816-818.	SET VS DET. Similar PR but high multiple rate in DET
33	Hashimoto S, Nakano T, Yamagata K, Inoue M, Morimoto Y, Nakaoka Y. Multinucleation per se is not always sufficient as a marker of abnormality to decide against transferring human embryos. Fertility and sterility 2016;106: 133-139.e136.	To assess the developmental competence of human embryos with multinucleation (MN).
34	Herrero J, Meseguer M. Selection of high potential embryos using time-lapse imaging: the era of morphokinetics. Fertility and sterility 2013;99: 1030-1034.	Review
35	Hojnik N, Vlaisavljević V, Kovačič B. Morphokinetic Characteristics and Developmental Potential of In Vitro Cultured Embryos from Natural Cycles in Patients with Poor Ovarian Response. Biomed Res Int 2016;2016: 4286528.	poor responders in natural cycle. Cycle normal cleavage between some abnormal cleavage. Primovision (standard incubator)
36	Kimelman D, Confino R, Okeigwe I, Lambe-Steinmiller J, Confino E, Shulman LP, Zhang JX, Pavone ME. Assessing the impact of delayed blastulation using time lapse morphokinetics and preimplantation genetic testing in an IVF patient population. Journal of assisted reproduction and genetics 2019;36: 1561-1569.	Determine the developmental competency of embryos with delayed blastulation.
37	Kovačič B, Taborin M, Vlaisavljević V. Artificial blastocoel collapse of human blastocysts before vitrification and its effect on re-expansion after warming - a prospective observational study using time-lapse microscopy. Reproductive biomedicine online 2018;36: 121-129.	surplus blastocysts were laser collapsed before vitrification. Analysis of relationship between time and pattern of reexpansion and LBR
38	Kovacs P, Matyas S, Forgacs V, Sajgo A, Molnar L, Pribenszky C. Non-invasive embryo evaluation and selection using time-lapse monitoring: Results of a randomized controlled study. European journal of obstetrics, gynecology, and reproductive biology 2019;233: 58-63.	TL algorithm and eSET (TL-eSET), Group 2.: standard morphology based selection for eSET (control-eSET).
39	Li M, Wang M, Xue X, Shi J. Day 3 time lapse selection is beneficial for the patients with no good-quality embryos. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2021;37: 31-34.	Not SET vs DET
40	Liu Y, Feenan K, Chapple V, Matson P. Assessing efficacy of day 3 embryo time-lapse algorithms retrospectively: impacts of dataset type and confounding factors. Human fertility (Cambridge, England) 2019;22: 182-190.	Transfer of 1 or 2 embryos. Retrospectively 4 TL algorithm were applied and compared.

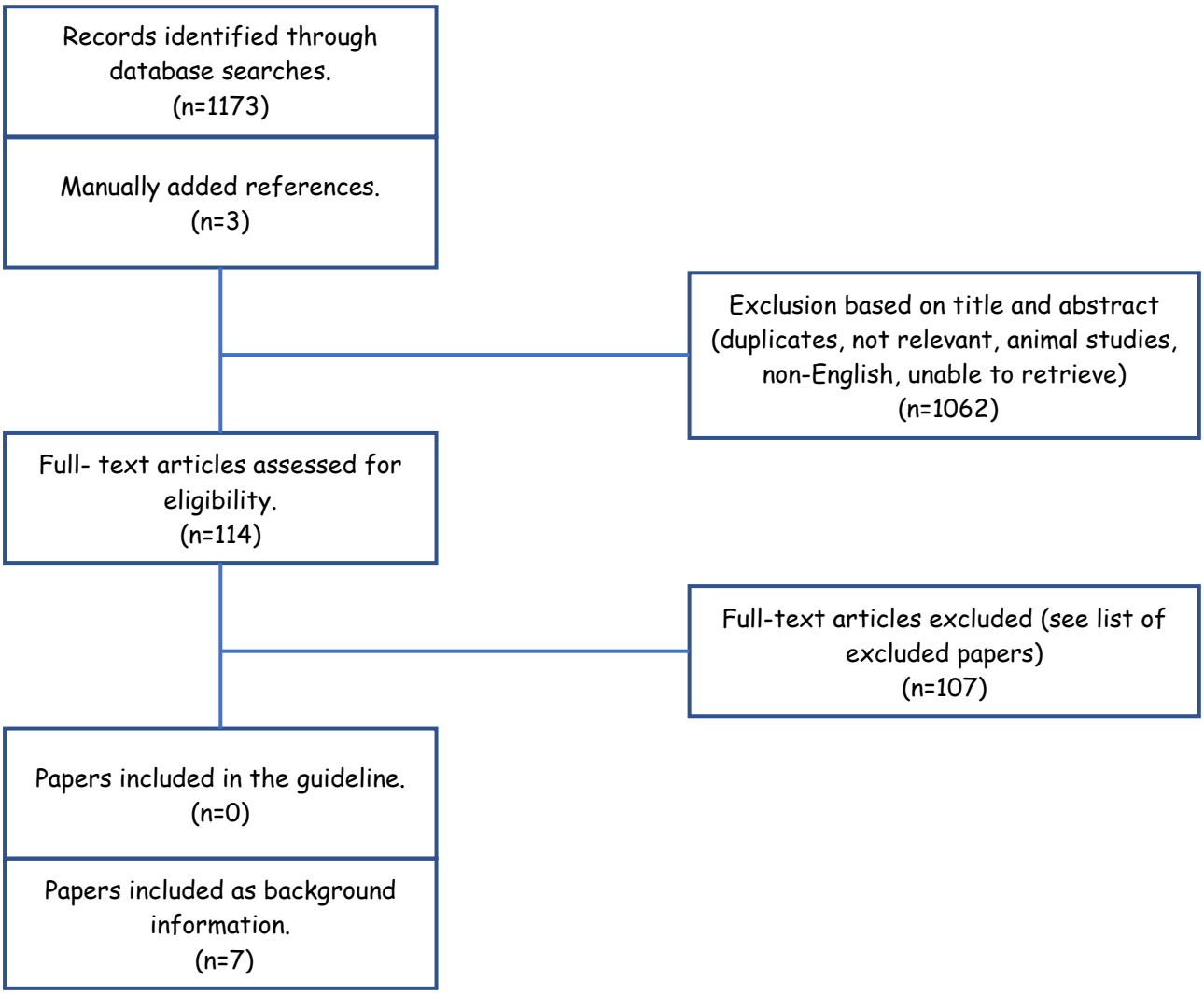
41	Mascarenhas M, Fox SJ, Thompson K, Balen AH. Cumulative live birth rates and perinatal outcomes with the use of time-lapse imaging incubators for embryo culture: a retrospective cohort study of 1882 ART cycles. BJOG : an international journal of obstetrics and gynaecology 2019;126: 280-286.	TLI improves perinatal outcomes and higher mean birth weight after fresh and frozen transfer
42	Ohata K, Ezoe K, Miki T, Morita H, Tsuchiya R, Kaneko S, Okimura T, Uchiyama K, Yabuuchi A, Kobayashi T et al. Blastomere movement post first cell division correlates with embryonic compaction and subsequent blastocyst formation. Reproductive biology and endocrinology : RB&E 2019;17: 44.	different embryo blastomere cleavage forms
43	Polanski LT, Coelho Neto MA, Nastri CO, Navarro PA, Ferriani RA, Raine-Fenning N, Martins WP. Time-lapse embryo imaging for improving reproductive outcomes: systematic review and meta-analysis. Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology 2014;44: 394-401.	METANALYSIS Not SET vs DET
44	Reignier A, Girard JM, Lammers J, Chtourou S, Lefebvre T, Barriere P, Freour T. Performance of Day 5 KIDScore™ morphokinetic prediction models of implantation and live birth after single blastocyst transfer. Journal of assisted reproduction and genetics 2019;36: 2279-2285.	COMPARISON KID SCORE D5 VERSION 1 AND 2
45	Revelli A, Canosa S, Carosso A, Filippini C, Paschero C, Gennarelli G, Delle Piane L, Benedetto C. Impact of the addition of Early Embryo Viability Assessment to morphological evaluation on the accuracy of embryo selection on day 3 or day 5: a retrospective analysis. Journal of ovarian research 2019;12: 73.	DET D3: morph+/- TL vs SET D5:+/- TL No relevant outcomes (only IR and OP)
46	Roesner S, Dietrich JE, Weigert J, Montag M, Toth B, Strowitzki T. Time-lapse imaging reveals differences in growth dynamics of embryos after in vitro maturation compared with conventional stimulation. Fertility and sterility 2017;107: 606-612.e603.	PCOS IVM or Not or stimulation
47	Rosenwaks Z. Introduction: Biomarkers of embryo viability: the search for the "holy grail" of embryo selection. Fertility and sterility 2017;108: 719-721.	Review
48	Saraeva NV, Spiridonova NV, Tugushev MT, Shurygina OV, Arabadzhyan SI, Victorovna IO. Experience of using time lapse microscopy in the IVF program in patients with good ovarian reserve. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2019;35: 15-17.	COMPARISON CULTURE CONDITIONS TL vs Standard Incubator
49	Sayed S, Reigstad MM, Petersen BM, Schwennicke A, Wegner Hausken J, Storeng R. Time-lapse imaging derived morphokinetic variables reveal association with implantation and live birth following in vitro fertilization: A retrospective study using data from transferred human embryos. PloS one 2020;15: e0242377.	Not SET vs DET
50	Stecher A, Vanderzwalmen P, Zintz M, Wirleitner B, Schuff M, Spitzer D, Zech NH. Transfer of blastocysts with deviant morphological and morphokinetic parameters at early stages of in-vitro development: a case series. Reproductive biomedicine online 2014;28: 424-435.	case report evidence that Embryo development is sometimes surprisingly
51	Sundvall L, Kirkegaard K, Ingerslev HJ, Knudsen UB. Unaltered timing of embryo development in women with polycystic ovarian syndrome (PCOS): a time-lapse study. Journal of assisted reproduction and genetics 2015;32: 1031-1042.	PCOS SET
52	Tabibnejad N, Aflatoonian A, Motamedzadeh L, Soleimani M, Sadeghian-Nodoushan F, Talebi AR. Assessing ICSI outcome by combining non-invasive indicators: Early time-lapse morphokinetics and apoptosis in associated cumulus cells among women with the polycystic ovarian syndrome. Molecular reproduction and development 2018;85: 865-874.	Analysis of the relationship between Apoptosis in Cumulus cells of PCOS aged patients and TL and EQ parameters. TL as a complement in embryo selection.
53	Tiitinen A. Single embryo transfer: Why and how to identify the embryo with the best developmental potential. Best practice & research Clinical endocrinology & metabolism 2019;33: 77-88.	Review
54	Wang S, Chen L, Fang J, Jiang W, Zhang N. Comparison of the pregnancy and obstetric outcomes between single cleavage-stage embryo transfer and single blastocyst transfer by time-lapse selection of embryos. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2019;35: 792-795.	D3 TL vs D5 TL
55	Wu L, Han W, Wang J, Zhang X, Liu W, Xiong S, Han S, Liu J, Gao Y, Huang G. Embryo culture using a time-lapse monitoring system improves live birth rates compared with a conventional culture system: a prospective cohort study. Human fertility (Cambridge, England) 2018;21: 255-262.	TL culture improves embryo quality, PR and OPR vs NO TL culture
56	Zaninovic N, Irani M, Meseguer M. Assessment of embryo morphology and developmental dynamics by time-lapse microscopy: is there a relation to implantation and ploidy? Fertility and sterility 2017;108: 722-729.	Review

PICO 19. Can the outcome of PGT-A testing of blastocysts be considered a factor in deciding to apply DET instead of (e)SET for couples/individuals undergoing ART?

Search strings

PUBMED	("Preimplantation Diagnosis"[Mesh] AND "Preimplantation genetic testing" OR "preimplantation genetic screening" OR "preimplantation genetic diagnosis" OR "cytogenetic analysis" OR "*euploid" OR " fluorescence in situ hybridization" OR "array comparative genomic hybridization" OR "Next generation sequencing" OR PGT OR PGD OR PGS OR FISH OR CGH OR NGS) AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy" OR "frozen cycle") AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	("Preimplantation Diagnosis"[Mesh] AND "Preimplantation genetic testing" OR "preimplantation genetic screening" OR "preimplantation genetic diagnosis" OR "cytogenetic analysis" OR "*euploid" OR PGT OR PGD OR PGS) AND ("Embryo Transfer"[Mesh] OR DET OR SET OR eSET OR "double embryo transfer" OR "single embryo transfer" OR "embryo transfer strategy" OR "transfer strategies" OR "embryo transfer policy" OR "frozen cycle") AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Ao A, Ray P, Harper J, Lesko J, Paraschos T, Atkinson G, Soussis I, Taylor D, Handyside A, Hughes M et al. Clinical experience with preimplantation genetic diagnosis of cystic fibrosis (delta F508). Prenatal diagnosis 1996;16: 137-142.	Old study using D2-3 biopsy, no comparison of SET or DET
2	Bay B, Ingerslev HJ, Lemmen JG, Degn B, Rasmussen IA, Kesmodel US. Preimplantation genetic diagnosis: a national multicenter obstetric and neonatal follow-up study. Fertility and sterility 2016;106: 1363-1369.e1361.	Danish National Birth Registry review of PGT vs IVF/ICSI vs. spontaneous conception. No comparison of eSET vs DET
3	Ben-Nagi J, Wells D, Doye K, Loutradi K, Exeter H, Drew E, Alfarawati S, Naja R, Serhal P. Karyomapping: a single centre's experience from application of methodology to ongoing pregnancy and live-birth rates. Reproductive biomedicine online 2017;35: 264-271.	All eSET apart from 1 x DET
4	Braude P, Flinter F. Use and misuse of preimplantation genetic testing. BMJ (Clinical research ed) 2007;335: 752-754.	Opinion article, no mention of eSET vs DET
5	Braude P. Selecting the 'best' embryos: prospects for improvement. Reproductive biomedicine online 2013;27: 644-653.	Opinion article promoting eSET over DET, but no evidence for PGT
6	Brunet B, Shen J, Cai L, Xie J, Cui Y, Liu J, Wu W. Preimplantation genetic testing for complex chromosomal rearrangement carriers by next-generation sequencing. Reproductive biomedicine online 2018;37: 375-382.	Only 6 patients, all PGT, all had eSET
7	Butterworth S. Blastocyst culture: myth or magic? Human fertility (Cambridge, England) 2001;4: 109-116.	Opinion article, no comparison of eSET vs DET. All about blastocyst culture, not PGT
8	Capalbo A, Treff N, Cimadomo D, Tao X, Ferrero S, Vaiarelli A, Colamaria S, Maggiulli R, Orlando G, Scarica C et al. Abnormally fertilized oocytes can result in healthy live births: improved genetic technologies for preimplantation genetic testing can be used to rescue viable embryos in in vitro fertilization cycles. Fertility and sterility 2017;108: 1007-1015.e1003.	Not relevant - compared 1PN vs 3PN zygotes
9	Cedars MI. Fresh versus frozen: initial transfer or cumulative cycle results: how do we interpret results and design studies? Fertility and sterility 2016;106: 251-256.	Opinion article, no comparison of eSET vs DET
10	Chamayou S, Alecci C, Ragolia C, Giambona A, Siciliano S, Maggio A, Fichera M, Guglielmino A. Successful application of preimplantation genetic diagnosis for beta-thalassaemia and sickle cell anaemia in Italy. Human reproduction (Oxford, England) 2002;17: 1158-1165.	Only 7 couples, mixture of eSET (2), DET (6) & TET(1), Insufficient numbers for conclusion
11	Cimadomo D, Capalbo A, Levi-Setti PE, Soscia D, Orlando G, Albani E, Parini V, Stoppa M, Dovere L, Tacconi L et al. Associations of blastocyst features, trophectoderm biopsy and other laboratory practice with post-warming behavior and implantation. Human reproduction (Oxford, England) 2018;33: 1992-2001.	Only SET
12	Cimadomo D, Rienzi L, Romanelli V, Alviggi E, Levi-Setti PE, Albani E, Dusi L, Papini L, Livi C, Benini F et al. Inconclusive chromosomal assessment after blastocyst biopsy: prevalence, causative factors and outcomes after re-biopsy and re-vitrification. A multicenter experience. Human reproduction (Oxford, England) 2018;33: 1839-1846.	This study did not address DET vs eSET
13	Cimadomo D, Soscia D, Vaiarelli A, Maggiulli R, Capalbo A, Ubaldi FM, Rienzi L, Taylor TH, Patrick JL, Gitlin SA et al. Looking past the appearance: a comprehensive description of the clinical contribution of poor-quality blastocysts to increase live birth rates during cycles with aneuploidy testing. Human reproduction (Oxford, England) 2019;34: 1206-1214.	Not SET vs DET
14	Coates A, Bankowski BJ, Kung A, Griffin DK, Munne S. Differences in pregnancy outcomes in donor egg frozen embryo transfer (FET) cycles following preimplantation genetic screening (PGS): a single center retrospective study. Journal of assisted reproduction and genetics 2017;34: 71-78.	Better LBR with DET & PGTa compared to no PGTa. Close, but not sign.diff. for SET
15	Coates A, Kung A, Mounts E, Hesla J, Bankowski B, Barbieri E, Ata B, Cohen J, Munné S. Optimal euploid embryo transfer strategy, fresh versus frozen, after preimplantation genetic screening with next generation sequencing: a randomized controlled trial. Fertility and sterility 2017;107: 723-730.e723.	Did not compare SET vs.DET

16	Coll L, Parriego M, Boada M, Devesa M, Arroyo G, Rodríguez I, Coroleu B, Vidal F, Veiga A. Transition from blastomere to trophectoderm biopsy: comparing two preimplantation genetic testing for aneuploidies strategies. Zygote (Cambridge, England) 2018;26: 191-198.	When transferring two euploid embryos and achieving pregnancy, multiple pregnancies were very high (58.6% in Group 1 and 66.6% in Group 2; data not shown). This fact makes evident that single euploid blastocyst transfer must be strongly recommended in PGT-A cycles
17	Dahdouh EM, Balayla J, García-Velasco JA. Impact of blastocyst biopsy and comprehensive chromosome screening technology on preimplantation genetic screening: a systematic review of randomized controlled trials. Reproductive biomedicine online 2015;30: 281-289.	Not available
18	Das M, Holzer HE. Recurrent implantation failure: gamete and embryo factors. Fertility and sterility 2012;97: 1021-1027.	Review showing TE PGT-A improves embryo selection in eSET practice, maintaining the same ongoing pregnancy rates between PGS and control groups, while sharply decreasing multiple pregnancy rate
19	Debrock S, Melotte C, Spiessens C, Peeraer K, Vanneste E, Meeuwis L, Meuleman C, Frijns JP, Vermeesch JR, D'Hooghe TM. Preimplantation genetic screening for aneuploidy of embryos after in vitro fertilization in women aged at least 35 years: a prospective randomized trial. Fertility and sterility 2010;93: 364-373.	Shows PGT-A is good for Rif, no comparison of SET vs. DET
20	Destouni A, Dimitriadou E, Masset H, Debrock S, Melotte C, Van Den Bogaert K, Zamani Esteki M, Ding J, Voet T, Denayer E et al. Genome-wide haplotyping embryos developing from 0PN and 1PN zygotes increases transferrable embryos in PGT-M. Human reproduction (Oxford, England) 2018;33: 2302-2311.	No comparison fo Det vs eSET
21	El-Toukhy T, Kamal A, Wharf E, Grace J, Bolton V, Khalaf Y, Braude P. Reduction of the multiple pregnancy rate in a preimplantation genetic diagnosis programme after introduction of single blastocyst transfer and cryopreservation of blastocysts biopsied on day 3. Human reproduction (Oxford, England) 2009;24: 2642-2648.	Study shows 0PN & 1PN zygotes can be diploid
22	El-Toukhy T, Khalaf Y, Braude P. IVF results: optimize not maximize. American journal of obstetrics and gynecology 2006;194: 322-331.	Study shows that with D3 biopsy, same preg rate for DET vs eSET
23	Fedorova EM, Shlykova SA, Shunkina KV, Zaitceva OG, Lapina EN, Yanchuk TV, Kalugina AS. Outcomes of IVF cycles coupled with PGS by aCGH of embryos from donor and autologous oocytes, transferred after vitrification to women of advanced maternal age. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2017;33: 737-740.	Basic review to reduce multiple preg rate
24	Feichtinger M, Stopp T, Göbl C, Feichtinger E, Vaccari E, Mädel U, Laccone F, Stroh-Weigert M, Hengstschläger M, Feichtinger W et al. Increasing live birth rate by preimplantation genetic screening of pooled polar bodies using array comparative genomic hybridization. PloS one 2015;10: e0128317.	No comparison of DET vs SET
25	Ferraretti AP, Magli MC, Kopcow L, Gianaroli L. Prognostic role of preimplantation genetic diagnosis for aneuploidy in assisted reproductive technology outcome. Human reproduction (Oxford, England) 2004;19: 694-699.	PB bipsy, no comparison of DET vs SET
26	Forman EJ, Hong KH, Franasiak JM, Scott Jr RT. Obstetrical and neonatal outcomes from the BEST Trial: single embryo transfer with aneuploidy screening improves outcomes after in vitro fertilization without compromising delivery rates. American journal of obstetrics and gynecology 2014;210: 157.e151-157.e156.	Blastocyst Euploid Selective Transfer (BEST) Trial shwos PTA+SET better than DET

27	Freeman MR, Hinds MS, Howard KG, Howard JM, Hill GA. Guidance for elective single-embryo transfer should be applied to frozen embryo transfer cycles. Journal of assisted reproduction and genetics 2019;36: 939-946.	the outcome of the fresh IVF transfer or whether PGT-A was PGTA should not alter the recommendation for the transfer of a single vitrified blastocyst if all other criteria for eSET are met.
28	Friedenthal J, Maxwell SM, Munné S, Kramer Y, McCulloh DH, McCaffrey C, Grifo JA. Next generation sequencing for preimplantation genetic screening improves pregnancy outcomes compared with array comparative genomic hybridization in single thawed euploid embryo transfer cycles. Fertility and sterility 2018;109: 627-632.	Compared PGT with NGS vs aCGH
29	Gianaroli L, Magli MC, Ferraretti AP. The in vivo and in vitro efficiency and efficacy of PGD for aneuploidy. Molecular and cellular endocrinology 2001;183 Suppl 1: S13-18.	Old paper, no comparison for DET-SET
30	Gleicher N, Kushnir VA, Barad DH. Worldwide decline of IVF birth rates and its probable causes. Human reproduction open 2019;2019: hoz017.	No comparison of DET-SET
31	Gorodeckaja J, Neumann S, McCollin A, Ottolini CS. High implantation and clinical pregnancy rates with single vitrified-warmed blastocyst transfer and optional aneuploidy testing for all patients. Human fertility (Cambridge, England) 2019;34: 1-12.	only SET
32	Haddad G, Deng M, Wang CT, Witz C, Williams D, Griffith J, Skorupski J, Gill J, Wang WH. Assessment of aneuploidy formation in human blastocysts resulting from donated eggs and the necessity of the embryos for aneuploidy screening. Journal of assisted reproduction and genetics 2015;32: 999-1006.	PGS of blastocysts should be considered to be one of the approaches to improve embryo implantation if single embryo transfer is implemented. PGS may not be necessary if multiple embryos are transferred
33	Hamberger L, Hardarson T, Nygren KG. Avoidance of multiple pregnancy by use of single embryo transfer. Minerva ginecologica 2005;57: 15-19.	Not relevant for this PICO
34	Harbottle S, Hughes C, Cutting R, Roberts S, Brison D. Elective Single Embryo Transfer: an update to UK Best Practice Guidelines. Human fertility (Cambridge, England) 2015;18: 165-183.	Descriptive review, nothing new
35	Hernandez-Nieto C, Lee J, Nazem T, Gounko D, Copperman A, Sandler B. Embryo aneuploidy is not impacted by selective serotonin reuptake inhibitor exposure. Fertility and sterility 2017;108: 973-979.	Not relevant
36	Hernandez-Nieto C, Lee JA, Slifkin R, Sandler B, Copperman AB, Flisser E. What is the reproductive potential of day 7 euploid embryos? Human reproduction (Oxford, England) 2019;34: 1697-1706.	No comparison of DET-SET
37	Ho PC. New frontiers of assisted reproductive technology (Chien Tien Hsu Memorial Lecture 2007). The journal of obstetrics and gynaecology research 2009;35: 1-8.	Descriptive only
38	Idowu D, Merrion K, Wemmer N, Mash JG, Pettersen B, Kijacic D, Lathi RB. Pregnancy outcomes following 24-chromosome preimplantation genetic diagnosis in couples with balanced reciprocal or Robertsonian translocations. Fertility and sterility 2015;103: 1037-1042.	No comparison of DET-SET
39	Intracytoplasmic sperm injection (ICSI) in 2006: evidence and evolution. Human reproduction update 2007;13: 515-526.	Review concludes that more studies are needed to provide evidence of eSET over DET
40	Irani M, Zaninovic N, Rosenwaks Z, Xu K. Does maternal age at retrieval influence the implantation potential of euploid blastocysts? American journal of obstetrics and gynecology 2019;220: 379.e371-379.e377.	No comparison of DET-SET
41	Jiang X, Zhao C, Xu W, Zhang R. The relationship between the percent of euploid embryo and the tolerance of embryo biopsy in preimplantation genetic screening: A systematic review and meta-analysis of randomized controlled trials. Medicine 2019;98: e15968.	Not relevant for this PICO

42	Kamath MS, Antonisamy B, Sunkara SK. Zygotic splitting following embryo biopsy: a cohort study of 207 697 single-embryo transfers following IVF treatment. BJOG : an international journal of obstetrics and gynaecology 2020;127: 562-569.	Large HFEA database review. eSET with PGTa demonstrates an increased risk of monozygotic splitting with embryo biopsy (2.4% vs 1.5%)
43	Kang HJ, Melnick AP, Stewart JD, Xu K, Rosenwaks Z. Preimplantation genetic screening: who benefits? Fertility and sterility 2016;106: 597-602.	No comparison of DET-SET
44	Keltz MD, Vega M, Sirota I, Lederman M, Moshier EL, Gonzales E, Stein D. Preimplantation genetic screening (PGS) with Comparative genomic hybridization (CGH) following day 3 single cell blastomere biopsy markedly improves IVF outcomes while lowering multiple pregnancies and miscarriages. Journal of assisted reproduction and genetics 2013;30: 1333-1339.	Low pt number, but PGTa led to a reduction of the number of the embryos transferred, reduced multiple pregnancy rates and resulted in a trend towards lower miscarriage rates.
45	Kimelman D, Confino R, Okeigwe I, Lambe-Steinmiller J, Confino E, Shulman LP, Zhang JX, Pavone ME. Assessing the impact of delayed blastulation using time lapse morphokinetics and preimplantation genetic testing in an IVF patient population. Journal of assisted reproduction and genetics 2019;36: 1561-1569.	No comparison of DET-SET
46	Kushnir VA, Darmon SK, Albertini DF, Barad DH, Gleicher N. Effectiveness of in vitro fertilization with preimplantation genetic screening: a reanalysis of United States assisted reproductive technology data 2011-2012. Fertility and sterility 2016;106: 75-79.	No comparison of DET-SET
47	Lee CI, Wu CH, Pai YP, Chang YJ, Chen CI, Lee TH, Lee MS. Performance of preimplantation genetic testing for aneuploidy in IVF cycles for patients with advanced maternal age, repeat implantation failure, and idiopathic recurrent miscarriage. Taiwanese journal of obstetrics & gynecology 2019;58: 239-243.	no. embryos tETd was significantly less in the PGS group (P<0.0001) than in either of non-PGS grops, females 40-43y
48	Lee HL, McCulloh DH, Hodes-Wertz B, Adler A, McCaffrey C, Grifo JA. In vitro fertilization with preimplantation genetic screening improves implantation and live birth in women age 40 through 43. Journal of assisted reproduction and genetics 2015;32: 435-444.	Did not compare SETvs.DET
49	Liebaers I, Sermon K, Staessen C, Joris H, Lissens W, Van Assche E, Nagy P, Bonduelle M, Vandervorst M, Devroey P et al. Clinical experience with preimplantation genetic diagnosis and intracytoplasmic sperm injection. Human reproduction (Oxford, England) 1998;13 Suppl 1: 186-195.	1998 study, 3 embryos Etd
50	Liss J, Pastuszek E, Pukszta S, Hoffmann E, Kuczynski W, Lukaszuk A, Lukaszuk K. Effect of next-generation sequencing in preimplantation genetic testing on live birth ratio. Reproduction, fertility, and development 2018;30: 1720-1727.	No distinction between SET & DET
51	Ma GC, Chen HF, Yang YS, Lin WH, Tsai FP, Lin CF, Chiu C, Chen M. A pilot proof-of-principle study to compare fresh and vitrified cycle preimplantation genetic screening by chromosome microarray and next generation sequencing. Molecular cytogenetics 2016;9.	Study show PGTa with SET improves preg rater, but low numbers
52	Maithripala S, Durland U, Havelock J, Kashyap S, Hitkari J, Tan J, Iews M, Lisonkova S, Bedaiwy MA. Prevalence and Treatment Choices for Couples with Recurrent Pregnancy Loss Due to Structural Chromosomal Anomalies. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2018;40: 655-662.	not relevant, no mention of SET
53	Masbou AK, Friedenthal JB, McCulloh DH, McCaffrey C, Fino ME, Grifo JA, Licciardi F. A Comparison of Pregnancy Outcomes in Patients Undergoing Donor Egg Single Embryo Transfers With and Without Preimplantation Genetic Testing. Reproductive sciences (Thousand Oaks, Calif) 2019;26: 1661-1665.	Donor eggs - benefits of performing PGT-A on donor egg embryos may be limited; FETs not as good as fresh, all with eSET. Study did not compared agaisnt DET, but relevant as donor eggs

54	Mastenbroek S, Twisk M, van Echten-Arends J, Sikkema-Raddatz B, Korevaar JC, Verhoeve HR, Vogel NE, Arts EG, de Vries JW, Bossuyt PM et al. In vitro fertilization with preimplantation genetic screening. New England journal of medicine 2007;357: 9-17.	2007 study showing poor results for PGT
55	Maxwell SM, Colls P, Hodes-Wertz B, McCulloh DH, McCaffrey C, Wells D, Munné S, Grifo JA. Why do euploid embryos miscarry? A case-control study comparing the rate of aneuploidy within presumed euploid embryos that resulted in miscarriage or live birth using next-generation sequencing. Fertility and sterility 2016;106: 1414-1419.e1415.	Review article. However, shows Increased implantation rates with PGT-A have paved the way for SET, significantly reducing multiple gestations(3).
56	Maxwell SM, Grifo JA. Should every embryo undergo preimplantation genetic testing for aneuploidy? A review of the modern approach to in vitro fertilization. Best practice & research Clinical obstetrics & gynaecology 2018;53: 38-47.	comparison of NGS vs aCGH
57	Mazzilli R, Cimadomo D, Vaiarelli A, Capalbo A, Dovere L, Alviggi E, Dusi L, Foresta C, Lombardo F, Lenzi A et al. Effect of the male factor on the clinical outcome of intracytoplasmic sperm injection combined with preimplantation aneuploidy testing: observational longitudinal cohort study of 1,219 consecutive cycles. Reproductive biomedicine online 2017;108: 961-972.e963.	Did not compare SET vs DET
58	McArthur SJ, Leigh D, Marshall JT, de Boer KA, Jansen RP. Pregnancies and live births after trophectoderm biopsy and preimplantation genetic testing of human blastocysts. Fertility and sterility 2005;84: 1628-1636.	Study shows D5 vs D3 PGT give higher implantation rate, so improves eSET by a low rate of twinning and miscarriage.
59	Meyer LR, Klipstein S, Hazlett WD, Nasta T, Mangan P, Karande VC. A prospective randomized controlled trial of preimplantation genetic screening in the "good prognosis" patient. Fertility and sterility 2009;91: 1731-1738.	2009 study showing D3 PGT no benefit
60	Munné S, Magli C, Cohen J, Morton P, Sadowy S, Gianaroli L, Tucker M, Márquez C, Sable D, Ferraretti AP et al. Positive outcome after preimplantation diagnosis of aneuploidy in human embryos. Human reproduction (Oxford, England) 1999;14: 2191-2199.	1999 study, D3 biopsy + FISH outdated technology
61	Neal SA, Morin SJ, Franasiak JM, Goodman LR, Juneau CR, Forman EJ, Werner MD, Scott RT, Jr. Preimplantation genetic testing for aneuploidy is cost-effective, shortens treatment time, and reduces the risk of failed embryo transfer and clinical miscarriage. Fertility and sterility 2018;110: 896-904.	No clear data on SET or DET
62	Okun N, Sierra S. Pregnancy outcomes after assisted human reproduction. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2014;36: 64-83.	General review document
63	Patrizio P, Bianchi V, Lalioti MD, Gerasimova T, Sakkas D. High rate of biological loss in assisted reproduction: it is in the seed, not in the soil. Reproductive biomedicine online 2007;14: 92-95.	Old study, no DET vs SET comparison
64	Patrizio P, Shoham G, Shoham Z, Leong M, Barad DH, Gleicher N. Worldwide live births following the transfer of chromosomally "Abnormal" embryos after PGT/A: results of a worldwide web-based survey. Journal of assisted reproduction and genetics 2019;36: 1599-1607.	PGT-A cannot reliably determine which embryos should be transferred - study is agaisnt use of PGTa
65	Pundir J, Magdalani L, El-Toukhy T. Outcome of preimplantation genetic diagnosis using FISH analysis for recurrent miscarriage in low-risk reciprocal translocation carriers. European journal of obstetrics, gynecology, and reproductive biology 2016;203: 214-219.	Up to 3 embryos Etd - no use
66	Quea G, Romero K, Garcia-Velasco JA. Extended embryo culture to increase implantation rate. Reproductive biomedicine online 2007;14: 375-383.	Loose review - no concrete facts
67	Rienzi L, Cimadomo D, Delgado A, Minasi MG, Fabozzi G, Gallego RD, Stoppa M, Bellver J, Giancani A, Esbert M et al. Time of morulation and trophectoderm quality are predictors of a live birth after euploid blastocyst transfer: a multicenter study. Fertility and sterility 2019;112: 1080-1093.e1081.	Mean no.embryos trasnferred was 1.9 & 1.7. Studfy used FISH
68	Rubio C, Bellver J, Rodrigo L, Bosch E, Mercader A, Vidal C, De los Santos MJ, Giles J, Labarta E, Domingo J et al. Preimplantation genetic screening using fluorescence in situ hybridization in patients with repetitive implantation failure and advanced maternal age: two randomized trials. Fertility and sterility 2013;99: 1400-1407.	Mean no.embryos trasnferred was 1.3 & 1.8. D3 bipsy with FISH

69	Rubio C, Bellver J, Rodrigo L, Castillon G, Guillen A, Vidal C, Giles J, Ferrando M, Cabanillas S, Remohi J et al. In vitro fertilization with preimplantation genetic diagnosis for aneuploidies in advanced maternal age: a randomized, controlled study (in press). Fertility and sterility 2017;14.	elective transfer of euploid blastocysts was shown to be an PGTa is ffective strategy to further facilitate SET policies, especially in advanced maternal age (AMA) women and to minimize miscarriages
70	Sacchi L, Albani E, Cesana A, Smeraldi A, Parini V, Fabiani M, Poli M, Capalbo A, Levi-Setti PE. Preimplantation Genetic Testing for Aneuploidy Improves Clinical, Gestational, and Neonatal Outcomes in Advanced Maternal Age Patients Without Compromising Cumulative Live-Birth Rate. Journal of assisted reproduction and genetics 2019;36: 2493-2504.	Descriptive review
71	Schmutzler AG. Theory and practice of preimplantation genetic screening (PGS). European journal of medical genetics 2019;62: 103670.	good study showing PGTa SET increases LBR
72	Schoolcraft WB, Katz-Jaffe MG. Comprehensive chromosome screening of trophectoderm with vitrification facilitates elective single-embryo transfer for infertile women with advanced maternal age. Fertility and sterility 2013;100: 615-619.	2011 initial study showing success of PGTa
73	Schoolcraft WB, Treff NR, Stevens JM, Ferry K, Katz-Jaffe M, Scott RT, Jr. Live birth outcome with trophectoderm biopsy, blastocyst vitrification, and single-nucleotide polymorphism microarray-based comprehensive chromosome screening in infertile patients. Fertility and sterility 2011;96: 638-640.	Not relevant for this PICO
74	Scriven PN, Zegers-Hochschild F, Schwarze JE, Crosby JA, Musri C, Urbina MT. A tale of two studies: now is no longer the best of times for preimplantation genetic testing for aneuploidy (PGT-A). Journal of assisted reproduction and genetics 2020;21: 164-175.	All patients had eSET.
75	Scriven PN. Towards a better understanding of preimplantation genetic screening for aneuploidy: insights from a virtual trial for women under the age of 40 when transferring embryos one at a time. Reproductive biology and endocrinology : RB&E 2017;15: 49.	Good 2020 review on use of PGTa SET
76	Shao YH, Zhang XY, Buckett W, Ao A. Impact of in vitro fertilization-preimplantation genetic testing (IVF-PGT) funding policy on clinical outcome: An issue that stems beyond effectiveness of treatment. European journal of obstetrics, gynecology, and reproductive biology 2019;235: 1-5.	More about monetary factors
77	Sharpe A, Avery P, Choudhary M. Reproductive outcome following pre-implantation genetic diagnosis (PGD) in the UK. Human fertility (Cambridge, England) 2018;21: 120-127.	No comments on SET vs DET
78	Simon AL, Kiehl M, Fischer E, Proctor JG, Bush MR, Givens C, Rabinowitz M, Demko ZP. Pregnancy outcomes from more than 1,800 in vitro fertilization cycles with the use of 24-chromosome single-nucleotide polymorphism-based preimplantation genetic testing for aneuploidy. Fertility and sterility 2018;110: 113-121.	Only SET
79	Staessen C, Platteau P, Van Assche E, Michiels A, Tournaye H, Camus M, Devroey P, Liebaers I, Van Steirteghem A. Comparison of blastocyst transfer with or without preimplantation genetic diagnosis for aneuploidy screening in couples with advanced maternal age: a prospective randomized controlled trial. Human reproduction (Oxford, England) 2004;19: 2849-2858.	No relevant intervention
80	Staessen C, Verpoest W, Donoso P, Haentjens P, Van der Elst J, Liebaers I, Devroey P. Preimplantation genetic screening does not improve delivery rate in women under the age of 36 following single-embryo transfer. Human reproduction (Oxford, England) 2008;23: 2818-2825.	Only SET
81	Su Y, Li JJ, Wang C, Haddad G, Wang WH. Aneuploidy analysis in day 7 human blastocysts produced by in vitro fertilization. Reproductive biology and endocrinology : RB&E 2016;14: 20.	Not relevant for this PICO
82	The use of preimplantation genetic testing for aneuploidy (PGT-A): a committee opinion. Fertility and sterility 2018;109: 429-436.	Not relevant for this PICO
83	Tiegs AW, Hodes-Wertz B, McCulloh DH, Munné S, Grifo JA. Discrepant diagnosis rate of array comparative genomic hybridization in thawed euploid blastocysts. Journal of assisted reproduction and genetics 2016;33: 893-897.	Not relevant for this PICO
84	Tiitinen A. Single embryo transfer: Why and how to identify the embryo with the best developmental potential. Best practice & research Clinical endocrinology & metabolism 2019;33: 77-88.	Narrative review
85	Toft CLF, Ingerslev HJ, Kesmodel US, Diemer T, Degn B, Ernst A, Okkels H, Kjartansdóttir KR, Pedersen IS. A systematic review on concurrent aneuploidy screening and preimplantation genetic testing for hereditary disorders: What is the prevalence of aneuploidy and is there a clinical effect from aneuploidy screening? Acta obstetricia et gynecologica Scandinavica 2020.	Not relevant for this PICO
86	Twisk M, Mastenbroek S, Hoek A, Heineman MJ, van der Veen F, Bossuyt PM, Repping S, Korevaar JC. No beneficial effect of preimplantation genetic screening in women of advanced maternal age with a high risk for embryonic aneuploidy. Human reproduction (Oxford, England) 2008;23: 2813-2817.	Not relevant for this PICO
87	Twisk M, Mastenbroek S, van Wely M, Heineman MJ, Van der Veen F, Repping S. Preimplantation genetic screening for abnormal number of chromosomes (aneuploidies) in in vitro fertilisation or intracytoplasmic sperm injection. Cochrane Database of Systematic Reviews 2006.	Not relevant for this PICO

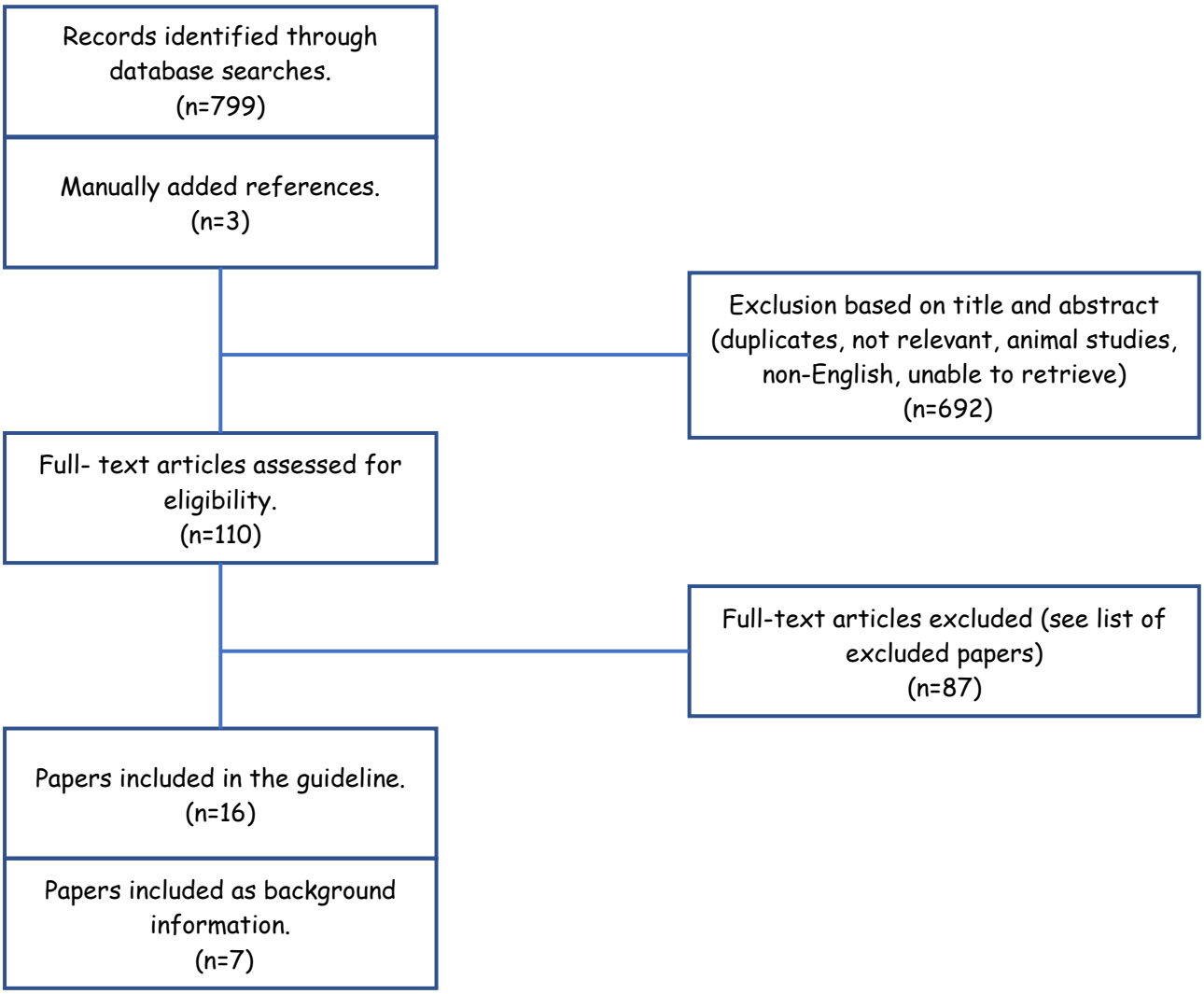
88	Ubaldi FM, Capalbo A, Colamaria S, Ferrero S, Maggiulli R, Vajta G, Sapienza F, Cimadomo D, Giuliani M, Gravotta E et al. Reduction of multiple pregnancies in the advanced maternal age population after implementation of an elective single embryo transfer policy coupled with enhanced embryo selection: pre- and post-intervention study. Human reproduction (Oxford, England) 2015;30: 2097-2106.	Not relevant population
89	Ubaldi FM, Cimadomo D, Capalbo A, Vaiarelli A, Buffo L, Trabucco E, Ferrero S, Albani E, Rienzi L, Levi Setti PE. Preimplantation genetic diagnosis for aneuploidy testing in women older than 44 years: a multicenter experience. Fertility and sterility 2017;107: 1173-1180.	Not SET vs DET
90	Vera-Rodriguez M, Rubio C. Assessing the true incidence of mosaicism in preimplantation embryos. Fertility and sterility 2017;107: 1107-1112.	Not relevant for this PICO
91	Verlinsky Y, Cieslak J, Ivakhnenko V, Evsikov S, Wolf G, White M, Lifchez A, Kaplan B, Moise J, Valle J et al. Prepregnancy genetic testing for age-related aneuploidies by polar body analysis. Genetic testing 1997;1: 231-235.	too old
92	Verlinsky Y, Cieslak J, Ivakhnenko V, Lifchez A, Strom C, Kuliev A. Birth of healthy children after preimplantation diagnosis of common aneuploidies by polar body fluorescent in situ hybridization analysis. Preimplantation Genetics Group. Fertility and sterility 1996;66: 126-129.	too old
93	Verpoest W, Haentjens P, De Rycke M, Staessen C, Sermon K, Bonduelle M, Devroey P, Liebaers I. Cumulative reproductive outcome after preimplantation genetic diagnosis: a report on 1498 couples. Human reproduction (Oxford, England) 2009;24: 2951-2959.	No relevant intervention
94	Verpoest W, Staessen C, Bossuyt PM, Goossens V, Altarescu G, Bonduelle M, Devesa M, Eldar-Geva T, Gianaroli L, Griesinger G et al. Preimplantation genetic testing for aneuploidy by microarray analysis of polar bodies in advanced maternal age: a randomized clinical trial. Human reproduction (Oxford, England) 2018;33: 1767-1776.	Not SET vs DET
95	Victor AR, Tyndall JC, Brake AJ, Lepkowsky LT, Murphy AE, Griffin DK, McCoy RC, Barnes FL, Zouves CG, Viotti M. One hundred mosaic embryos transferred prospectively in a single clinic: exploring when and why they result in healthy pregnancies. Fertility and sterility 2019;111: 280-293.	Not SET vs DET
96	Viñals Gonzalez X, Odia R, Naja R, Serhal P, Saab W, Seshadri S, Ben-Nagi J. Euploid blastocysts implant irrespective of their morphology after NGS-(PGT-A) testing in advanced maternal age patients. Journal of assisted reproduction and genetics 2019;36: 1623-1629.	Not SET vs DET
97	Wells D. Embryo aneuploidy and the role of morphological and genetic screening. Reproductive biomedicine online 2010;21: 274-277.	Not relevant for this PICO
98	Whitney JB, Schiewe MC, Anderson RE. Single center validation of routine blastocyst biopsy implementation. Journal of assisted reproduction and genetics 2016;33: 1507-1513.	Not relevant for this PICO
99	Wong KM, Repping S, Mastenbroek S. Limitations of embryo selection methods. Seminars in reproductive medicine 2014;32: 127-133.	No relevant intervention
100	Yakin K, Ata B, Ercelen N, Balaban B, Urman B. The effect of preimplantation genetic screening on the probability of live birth in young women with recurrent implantation failure; a nonrandomized parallel group trial. European journal of obstetrics, gynecology, and reproductive biology 2008;140: 224-229.	Only SET
101	Yang Z, Kuang Y, Meg Y, Zhang X, Zhang S, Lin J. Selection of single euploid blastocysts fpr transfer with high resolution next-generation sequencing improves live birth outcome for IVF patients: a prospective randomized study. Human reproduction Conference: 35th annual meeting of the european society of human reproduction and embryology ESHRE Vienna, austria 2019;34 Suppl 1.	Only SET
102	Young D, Klepacka D, McGarvey M, Schoolcraft WB, Katz-Jaffe MG. Infertility patients with chromosome inversions are not susceptible to an inter-chromosomal effect. Journal of assisted reproduction and genetics 2019;36: 509-516.	Not relevant for this PICO
103	Zakharova EE, Zaletova VV, Krivokharchenko AS. Biopsy of human morula-stage embryos: outcome of 215 IVF/ICSI cycles with PGS. PloS one 2014;9.	Not relevant for this PICO
104	Zegers-Hochschild F, Schwarze JE, Crosby J, Musri C, Urbina MT. Assisted Reproductive Techniques in Latin America: The Latin American Registry, 2015. JBRA assisted reproduction 2019;23: 143-153.	Not SET vs DET
105	Zhang L, Wei D, Zhu Y, Gao Y, Yan J, Chen ZJ. Rates of live birth after mosaic embryo transfer compared with euploid embryo transfer. Journal of assisted reproduction and genetics 2019;36: 165-172.	Not SET vs DET
106	Zhang S, Tan K, Gong F, Gu Y, Tan Y, Lu C, Luo K, Lu G, Lin G. Blastocysts can be rebiopsied for preimplantation genetic diagnosis and screening. Fertility and sterility 2014;102: 1641-1645.	Not relevant for this PICO
107	Zore T, Kroener LL, Wang C, Liu L, Buyalos R, Hubert G, Shamonki M. Transfer of embryos with segmental mosaicism is associated with a significant reduction in live-birth rate. Fertility and sterility 2019;111: 69-76.	No relevant intervention

PICO 20- In any patient undergoing ART, should the transfer of more than two embryos be applied considering the risks of the higher order pregnancies?

Search strings

PUBMED	("Embryo Transfer"[Mesh] AND "Pregnancy, Multiple"[Mesh]) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))
COCHRANE	("Embryo Transfer"[Mesh] AND "Pregnancy, Multiple"[Mesh]) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth" OR "Live birth rate" OR LBR OR "live birth percentage") OR ("Cumulative live birth rate" OR cLBR* OR "cumulative multiple birth rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Abdollahi M, Omani Samani R, Hemat M, Arabipoor A, Shabani F, Eskandari F, Salehi M. Factors that Influence the Occurrence of Multiple Pregnancies after Intracytoplasmic Injection Cycles with Two or Three Fresh Embryo Transfers. International journal of fertility & sterility 2017;11: 191-196.	Doesn't address the reason for TET adequately as pats were too young. - A significant relation existed between age and fertilization rate with multiple pregnancies in patients who underwent ICSI with TET.
2	Acharya KS, Keyhan S, Acharya CR, Yeh JS, Provost MP, Goldfarb JM, Muasher SJ. Do donor oocyte cycles comply with ASRM/SART embryo transfer guidelines? An analysis of 13,393 donor cycles from the SART registry. Fertility and sterility 2016;106: 603-607.	eSET vs DET only - Lack of compliance for donor oocytes
3	Arıoğlu Aydın Ç, Aydın S, Serdaroğlu H. Multifetal gestations with assisted reproductive technique before the single-embryo transfer legislation: obstetric, neonatal outcomes and congenital anomalies. The journal of maternal-fetal & neonatal medicine: the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet 2016;29: 2475-2480.	Compares neontal anomolies
4	Balassiano E, Malik S, Vaid P, Knochenhauer ES, Traub ML. The presence of multiple gestational sacs confers a higher live birth rate in women with infertility who achieve a positive pregnancy test after fresh and frozen embryo transfer: a retrospective local cohort. Reproductive biology and endocrinology : RB&E 2014;12: 104.	not relevant for this PICO
5	Beesley R, Robinson R, Propst A, Arthur N, Retzloff M. Impact of day 3 or day 5 embryo transfer on pregnancy rates and multiple gestations. Fertility and sterility 2009;91: 1717-1720.	D3 vs. D5
6	Bissonnette F, Phillips SJ, Gunby J, Holzer H, Mahutte N, St-Michel P, Kadoch IJ. Working to eliminate multiple pregnancies: a success story in Québec. Reproductive biomedicine online 2011;23: 500-504.	legislation -Quebec legislation
7	Blickstein I, Keith LG. The decreased rates of triplet births: temporal trends and biologic speculations. American journal of obstetrics and gynecology 2005;193: 327-331.	speculations

8	Borman E, Check JH. A comparison of clinical pregnancy rates and multiple gestation rates with 2 vs 3 embryos transferred with pairs matched for embryo quality. Clinical and experimental obstetrics & gynecology 2013;40: 196-197.	Not relevant
9	Brinsden PR. Controlling the high order multiple birth rate: the European perspective. Reproductive biomedicine online 2003;6: 339-344.	Outdated
10	Bromer JG, Sakkas D, Siano LJ, Benadiva CA, Patrizio P. Reproductive efficiency of women over the age of 40 and the low risk of multiple pregnancies. Reproductive biomedicine online 2009;19 Suppl 4: 4316.	No real data
11	Brown J, Daya S, Matson P. Day three versus day two embryo transfer following in vitro fertilization or intracytoplasmic sperm injection. Cochrane Database of Systematic Reviews 2016.	D2 vs De
12	Cabello Y, Gómez-Palomares JL, Castilla JA, Hernández J, Marqueta J, Pareja A, Luceño F, Hernández E, Coroleu B. Impact of the Spanish Fertility Society guidelines on the number of embryos to transfer. Reproductive biomedicine online 2010;21: 667-675.	legislation - Spanish legislation
13	Cohen J, Jones HW, Jr. How to avoid multiple pregnancies in assistive reproductive technologies. Seminars in reproductive medicine 2001;19: 269-278.	Old review, predicting what we have since done
14	Cook JL, Collins J, Buckett W, Racowsky C, Hughes E, Jarvi K. Assisted reproductive technology-related multiple births: Canada in an international context. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2011;33: 159-167.	Register - Canada legislation
15	Crawford S, Boulet SL, Jamieson DJ, Stone C, Mullen J, Kissin DM. Assisted reproductive technology use, embryo transfer practices, and birth outcomes after infertility insurance mandates: New Jersey and Connecticut. Fertility and sterility 2016;105: 347-355.	State insurance- but limited use
16	Csokmay JM, Hill MJ, Chason RJ, Hennessy S, James AN, Cohen J, Decherney AH, Segars JH, Payson MD. Experience with a patient-friendly, mandatory, single-blastocyst transfer policy: the power of one. Fertility and sterility 2011;96: 580-584.	eSET policy
17	Cutting R. Single embryo transfer for all. Best practice & research Clinical obstetrics & gynaecology 2018;53: 30-37.	Review
18	Damario MA, Hammitt DG, Session DR, Dumesic DA. Embryo cryopreservation at the pronuclear stage and efficient embryo use optimizes the chance for a liveborn infant from a single oocyte retrieval. Fertility and sterility 2000;73: 767-773.	Froze 2PNs on Day 1, but Etd 2.9+ embryos fresh anyway
19	Dare MR, Crowther CA, Dodd JM, Norman RJ. Single or multiple embryo transfer following in vitro fertilisation for improved neonatal outcome: a systematic review of the literature. The Australian & New Zealand journal of obstetrics & gynaecology 2004;44: 283-291.	no data on >2
20	De Geyter C, Calhaz-Jorge C, Kupka MS, Wyns C, Mocanu E, Motrenko T, Scaravelli G, Smeenk J, Vidakovic S, Goossens V. ART in Europe, 2014: results generated from European registries by ESHRE: The European IVF-monitoring Consortium (EIM) for the European Society of Human Reproduction and Embryology (ESHRE). Human reproduction (Oxford, England) 2018;33: 1586-1601.	EIM data
21	De Neubourg D, Gerris J, Van Royen E, Mangelschots K, Vercruyssen M. Impact of a restriction in the number of embryos transferred on the multiple pregnancy rate. European journal of obstetrics, gynecology, and reproductive biology 2006;124: 212-215.	About reimbursement
22	Debrock S, Spiessens C, Meuleman C, Segal L, De Loecker P, Meeuwis L, D'Hooghe TM. New Belgian legislation regarding the limitation of transferable embryos in in vitro fertilization cycles does not significantly influence the pregnancy rate but reduces the multiple pregnancy rate in a threefold way in the Leuven University Fertility Center. Fertility and sterility 2005;83: 1572-1574.	no data on >2
23	Dickey RP. The relative contribution of assisted reproductive technologies and ovulation induction to multiple births in the United States 5 years after the Society for Assisted Reproductive Technology/American Society for Reproductive Medicine recommendation to limit the number of embryos transferred. Fertility and sterility 2007;88: 1554-1561.	Register - US stats
24	El-Toukhy T, Kamal A, Wharf E, Grace J, Bolton V, Khalaf Y, Braude P. Reduction of the multiple pregnancy rate in a preimplantation genetic diagnosis programme after introduction of single blastocyst transfer and cryopreservation of blastocysts biopsied on day 3. Human reproduction (Oxford, England) 2009;24: 2642-2648.	Not relevant for this PICO
25	El-Toukhy T, Khalaf Y, Braude P. IVF results: optimize not maximize. American journal of obstetrics and gynecology 2006;194: 322-331.	general description
26	Engmann L, Maconochie N, Tan SL, Bekir J. Trends in the incidence of births and multiple births and the factors that determine the probability of multiple birth after IVF treatment. Human reproduction (Oxford, England) 2001;16: 2598-2605.	Old study but useful in stating that increasing the number of embryos transferred did not increase the chance of a birth but did increase the chance of a multiple birth.
27	Gerris J, De Neubourg D, Mangelschots K, Van Royen E, Vercruyssen M, Barudy-Vasquez J, Valkenburg M, Ryckaert G. Elective single day 3 embryo transfer halves the twinning rate without decrease in the ongoing pregnancy rate of an IVF/ICSI programme. Human reproduction (Oxford, England) 2002;17: 2626-2631.	Not about >2 embryos
28	Gerris J. Single-embryo transfer versus multiple-embryo transfer. Reproductive biomedicine online 2009;18 Suppl 2: 63-70.	eSET
29	Ghazal S, Patrizio P. Embryo wastage rates remain high in assisted reproductive technology (ART): a look at the trends from 2004-2013 in the USA. Journal of assisted reproduction and genetics 2017;34: 159-166.	Embryo wastage
30	Gleicher N, Weghofer A, Barad D. A formal comparison of the practice of assisted reproductive technologies between Europe and the USA. Human reproduction (Oxford, England) 2006;21: 1945-1950.	Us has more mutliple ETs
31	Gorrill MJ, Sadler-Fredd K, Patton PE, Burry KA. Multiple gestations in assisted reproductive technology: can they be avoided with blastocyst transfers? American journal of obstetrics and gynecology 2001;184: 1471-1475; discussion 1475-1477.	Retro study - n spite of a conservative approach to the number of blastocysts

		used for embryo transfer, the overall multiple pregnancy rate was high, and triplet pregnancies did occur
32	Guidelines for the number of embryos to transfer following in vitro fertilization No. 182, September 2006. International journal of gynaecology and obstetrics 2008;102: 203-216.	A guideline - Depends on if D2-3 embryos or D5 embryos at ET
33	Gunnala V, Reichman DE, Meyer L, Davis OK, Rosenwaks Z. Beyond the American Society for Reproductive Medicine transfer guidelines: how many cleavage-stage embryos are safe to transfer in women ≥43 years old? Fertility and sterility 2014;102: 1626-1632.e1621.	ET 5 or more D3 embryos may be a safe option for patients ≥43 years of age, as it is associated with an overall low rate of multiple gestations.
34	Harbottle S, Hughes C, Cutting R, Roberts S, Brison D. Elective Single Embryo Transfer: an update to UK Best Practice Guidelines. Human fertility (Cambridge, England) 2015;18: 165-183.	eSET
35	Jain T, Harlow BL, Hornstein MD. Insurance coverage and outcomes of in vitro fertilization. The New England journal of medicine 2002;347: 661-666.	Insurance - About insurance of IVF
36	Jain T, Missmer SA, Hornstein MD. Trends in embryo-transfer practice and in outcomes of the use of assisted reproductive technology in the United States. The New England journal of medicine 2004;350: 1639-1645.	no data on >2
37	Jaspal R, Prior T, Denton J, Salim R, Banerjee J, Christoph L. The impact of cross-border IVF on maternal and neonatal outcomes in multiple pregnancies: Experience from a UK fetal medicine service. European journal of obstetrics, gynecology, and reproductive biology 2019;238: 63-67.	Not relevant to the PICO - 75% of women treated overseas conceived a triplet or higher order pregnancy compared to fewer than 10% of women who conceived in the UK
38	Karaki RZ, Samarraie SS, Younis NA, Lahloub TM, Ibrahim MH. Blastocyst culture and transfer: a step toward improved in vitro fertilization outcome. Fertility and sterility 2002;77: 114-118.	Predicts benefit of D5 ETs
39	Karlström PO, Bergh C. Reducing the number of embryos transferred in Sweden-impact on delivery and multiple birth rates. Human reproduction (Oxford, England) 2007;22: 2202-2207.	eSET
40	Kissin DM, Kulkarni AD, Kushnir VA, Jamieson DJ. Number of embryos transferred after in vitro fertilization and good perinatal outcome. Obstetrics and gynecology 2014;123: 239-247.	eSET in <35y
41	Kissin DM, Kulkarni AD, Mneimneh A, Warner L, Boulet SL, Crawford S, Jamieson DJ. Embryo transfer practices and multiple births resulting from assisted reproductive technology: an opportunity for prevention. Fertility and sterility 2015;103: 954-961.	Not relevant for this PICO
42	Knez J, Kovačič B, Vlaisavljević V. Comparison of embryo transfer strategies and assisted reproduction outcome in Slovenian and cross-border patients. Reproductive biomedicine online 2013;27: 310-315.	Insurance affects - nothing to do with question
43	Komori S, Kasumi H, Horiuchi I, Hamada Y, Suzuki C, Shigeta M, Koyama K. Prevention of multiple pregnancies by restricting the number of transferred embryos: randomized control study. Archives of gynecology and obstetrics 2004;270: 91-93.	no data on >2
44	Kutlu P, Atvar O, Vanlioglu OF, Kutlu U, Arici A, Yilmaz S, Yilmaz E, Delikara N, Bener F, Kamar A et al. Effect of the new legislation and single-embryo transfer policy in Turkey on assisted reproduction outcomes: preliminary results. Reproductive biomedicine online 2011;22: 208-214.	legislation- Turkey legislation
45	La Sala GB, Nicoli A, Capodanno F, Villani MT, Iannotti F, Blickstein I. The effect of the 2004 Italian legislation on perinatal outcomes following assisted reproduction technology. Journal of perinatal medicine 2009;37: 43-47.	Register- About Italian law
46	La Sala GB, Villani MT, Nicoli A, Valli B, Iannotti F, Blickstein I. The effect of legislation on outcomes of assisted reproduction technology: lessons from the 2004 Italian law. Fertility and sterility 2008;89: 854-859.	Register- About Italana law meaning no selection
47	Lawlor DA, Nelson SM. Effect of age on decisions about the numbers of embryos to transfer in assisted conception: a prospective study. Lancet (London, England) 2012;379: 521-527.	SET vs DET. Livebirth rates did not increase with transfer of three embryos, but the risk of adverse perinatal outcomes did increase.
48	Lee TH, Chen CD, Tsai YY, Chang LJ, Ho HN, Yang YS. Embryo quality is more important for younger women whereas age is more important for older women with regard to in vitro fertilization outcome and multiple pregnancy. Fertility and sterility 2006;86: 64-69.	morphology criteria can help reduce the number of embryos transferred - so ? Poor morh could be used to justigy TET - Not relevant to this question
49	Lee TH, Chen CD, Wu MY, Chen HF, Chen SU, Ho HN, Yang YS. Blastocyst morphology score as an indicator of embryo competence for women aged younger than 38 years in in vitro fertilization cycles. Taiwanese journal of obstetrics & gynecology 2013;52: 374-380.	correlation between blastocyst morphology and pregnancy outcome was mainly affected by female age
50	Licciardi F, Berkeley AS, Krey L, Grifo J, Noyes N. A two- versus three-embryo transfer: the oocyte donation model. Fertility and sterility 2001;75: 510-513.	Reducing the number of embryos transferred in an oocyte donation cycle can lower the incidence of triplet

		pregnancies without significantly lowering the overall pregnancy rate.
51	Mansour R, Ishihara O, Adamson GD, Dyer S, de Mouzon J, Nygren KG, Sullivan E, Zegers-Hochschild F. International Committee for Monitoring Assisted Reproductive Technologies world report: Assisted Reproductive Technology 2006. Human reproduction (Oxford, England) 2014;29: 1536-1551.	ICMART data
52	Matorras R, Matorras F, Mendoza R, Rodríguez M, Remohí J, Rodríguez-Escudero FJ, Simón C. The implantation of every embryo facilitates the chances of the remaining embryos to implant in an IVF programme: a mathematical model to predict pregnancy and multiple pregnancy rates. Human reproduction (Oxford, England) 2005;20: 2923-2931.	Mth model up to 5 embryos
53	Miller LM, Hodgson R, Wong TY, Merrilees M, Norman RJ, Johnson NP. Single embryo transfer for all? The Australian & New Zealand journal of obstetrics & gynaecology 2016;56: 514-517.	No full text - about reimbursement
54	Miller PB, Forstein DA, Usadi RS, Lessey BA, Higdon HL, 3rd, Boone WR. Assisted reproductive technology (ART) in the upstate: reducing the risks of multiple births. Journal of the South Carolina Medical Association (1975) 2005;101: 373-377.	Only eSET
55	Nyboe Andersen A, Goossens V, Bhattacharya S, Ferraretti AP, Kupka MS, de Mouzon J, Nygren KG. Assisted reproductive technology and intrauterine inseminations in Europe, 2005: results generated from European registers by ESHRE: ESHRE. The European IVF Monitoring Programme (EIM), for the European Society of Human Reproduction and Embryology (ESHRE). Human reproduction (Oxford, England) 2009;24: 1267-1287.	EIM data
56	Nygren KG, Andersen AN. Assisted reproductive technology in Europe, 1999. Results generated from European registers by ESHRE. Human reproduction (Oxford, England) 2002;17: 3260-3274.	Review of 1999 data
57	Okun N, Sierra S. Pregnancy outcomes after assisted human reproduction. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2014;36: 64-83.	Register - General review of Candaian practice
58	Olukoya OY, Okeke CC, Kemi AI, Ogbeche RO, Adewusi AJ, Ashiru OA. Multiple gestations/pregnancies from IVF process in a fertility center in Nigeria, 2009-2011: implementing policy towards fewer (double and single) embryo transfer. Nigerian quarterly journal of hospital medicine 2012;22: 80-84.	Register- Nigerian data
59	Orhue AA, Aziken ME, Osemwenkha AP, Ibadin KO, Odoma G. In vitro fertilization at a public hospital in Nigeria. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics 2012;118: 56-60.	Not revelant Nigerian data
60	Pandian Z, Marjoribanks J, Ozturk O, Serour G, Bhattacharya S. Number of embryos for transfer following in vitro fertilisation or intra-cytoplasmic sperm injection. The Cochrane database of systematic reviews 2013;2013: Cd003416.	eSET vs DET
61	Peeraer K, Debrock S, Laenen A, De Loecker P, Spiessens C, De Neubourg D, D'Hooghe TM. The impact of legally restricted embryo transfer and reimbursement policy on cumulative delivery rate after treatment with assisted reproduction technology. Human reproduction (Oxford, England) 2014;29: 267-275.	eSET -shows beenfit of eSET cumulatively
62	Provost MP, Thomas SM, Yeh JS, Hurd WW, Eaton JL. State Insurance Mandates and Multiple Birth Rates After In Vitro Fertilization. Obstetrics and gynecology 2016;128: 1205-1214.	State insurance
63	Quea G, Romero K, Garcia-Velasco JA. Extended embryo culture to increase implantation rate. Reproductive biomedicine online 2007;14: 375-383.	Benefots of D5
64	Racowsky C. High rates of embryonic loss, yet high incidence of multiple births in human ART: is this paradoxical? Theriogenology 2002;57: 87-96.	Review predicting PGT & better morph scoring
65	Reynolds MA, Schieve LA, Jeng G, Peterson HB, Wilcox LS. Risk of multiple birth associated with in vitro fertilization using donor eggs. American journal of epidemiology 2001;154: 1043-1050.	Data analysis only - non-donor procedures among women aged 38–40 and 41–42 years respectively) and transferring ≥3 embryos remained the norm for all groups
66	Reynolds MA, Schieve LA, Jeng G, Peterson HB. Does insurance coverage decrease the risk for multiple births associated with assisted reproductive technology? Fertility and sterility 2003;80: 16-23.	In the US, insurance coverage for ART influenced no. of embryos Etd
67	Reynolds MA, Schieve LA. Trends in embryo transfer practices and multiple gestation for IVF procedures in the USA, 1996-2002. Human reproduction (Oxford, England) 2006;21: 694-700.	Data from 1996-97
68	Salihu HM, Aliyu MH, Rouse DJ, Kirby RS, Alexander GR. Potentially preventable excess mortality among higher-order multiples. Obstetrics and gynecology 2003;102: 679-684.	early mortality increased significantly with each additional fetus
69	Schnorr JA, Doviak MJ, Muasher SJ, Jones HW, Jr. Impact of a cryopreservation program on the multiple pregnancy rate associated with assisted reproductive technologies. Fertility and sterility 2001;75: 147-151.	No relevant - The freezing of single embryos is of no benefit in cumulative pregnancy rates
70	Scholten I, Chambers GM, van Loendersloot L, van der Veen F, Repping S, Gianotten J, Hompes PG, Ledger W, Mol BW. Impact of assisted reproductive technology on the incidence of multiple-gestation infants: a population perspective. Fertility and sterility 2015;103: 179-183.	Not relevant for PICO
71	Smith AL. Blastocyst culture in human IVF: the final destination or a stop along the way? Theriogenology 2002;57: 97-107.	Disucssion about D5 culture benefits
72	Ubaldi FM, Capalbo A, Colamaria S, Ferrero S, Maggiulli R, Vajta G, Sapienza F, Cimadomo D, Giuliani M, Gravotta E et al. Reduction of multiple pregnancies in the advanced maternal age population after implementation of an elective single embryo transfer policy coupled with enhanced embryo selection: pre- and post-intervention study. Human reproduction (Oxford, England) 2015;30: 2097-2106.	PGT

73	Umranikar A, Parmar D, Davies S, Fountain S. Multiple births following in vitro fertilization treatment: redefining success. European journal of obstetrics, gynecology, and reproductive biology 2013;170: 299-304.	poor abstract
74	Vaegter KK, Berglund L, Tilly J, Hadziosmanovic N, Brodin T, Holte J. Construction and validation of a prediction model to minimize twin rates at preserved high live birth rates after IVF. Reproductive biomedicine online 2019;38: 22-29.	Prediciton model, not relevant for this PICO
75	Van den Bergh M, Hohl MK, De Geyter C, Stalberg AM, Limoni C. Ten years of Swiss National IVF Register FIVNAT-CH. Are we making progress? Reproductive biomedicine online 2005;11: 632-640.	old data
76	Van Landuyt L, Verheyen G, Tournaye H, Camus M, Devroey P, Van Steirteghem A. New Belgian embryo transfer policy leads to sharp decrease in multiple pregnancy rate. Reproductive biomedicine online 2006;13: 765-771.	Not Addressijng questipon - Elective single embryo transfer should be considered more seriously for women 36-39 years of age.
77	Westergaard HB, Johansen AM, Erb K, Andersen AN. Danish National IVF Registry 1994 and 1995. Treatment, pregnancy outcome and complications during pregnancy. Acta obstetricia et gynecologica Scandinavica 2000;79: 384-389.	Excldued due to data from 1994-1995
78	White PM. "One for Sorrow, Two for Joy?": American embryo transfer guideline recommendations, practices, and outcomes for gestational surrogate patients. Journal of assisted reproduction and genetics 2017;34: 431-443.	TET in surrogate with donor eggs so not answering question
79	Wilson M, Hartke K, Kiehl M, Rodgers J, Brabec C, Lyles R. Integration of blastocyst transfer for all patients. Fertility and sterility 2002;77: 693-696.	Predcits benefits of D5
80	Wilson M, Hartke K, Kiehl M, Rodgers J, Brabec C, Lyles R. Transfer of blastocysts and morulae on day 5. Fertility and sterility 2004;82: 327-333.	no data on >2
81	Wimalasundera RC, Trew G, Fisk NM. Reducing the incidence of twins and triplets. Best practice & research Clinical obstetrics & gynaecology 2003;17: 309-329.	reducing to 2 or less will reduce MPR
82	Wunder D, Neurohr EM, Faouzi M, Birkhäuser MH. Origin and outcome of multiple pregnancies in Bern, Switzerland, 1995-2006 and the current proposal of the Swiss parliament to revise the Swiss law of reproductive medicine: Switzerland quo vadis? Swiss medical weekly 2013;143: w13864.	legislation- Swiss law
83	Yamashita S, Ikemoto Y, Ochiai A, Yamada S, Kato K, Ohno M, Segawa T, Nakaoka Y, Toya M, Kawachiya S et al. Analysis of 122 triplet and one quadruplet pregnancies after single embryo transfer in Japan. Reproductive biomedicine online 2020;40: 374-380.	Register - Japanese register
84	Yilmaz N, Engin-Üstün Y, Inal H, Gorkem U, Bardakci Y, Gulerman C. The impact of single embryo transfer policy on pregnancy outcomes after legislative change. Gynecological endocrinology : the official journal of the International Society of Gynecological Endocrinology 2013;29: 600-602.	up to DET
85	Zegers-Hochschild F, Schwarze JE, Crosby J, Musri C, Urbina MT. Assisted reproduction techniques in Latin America: the Latin American Registry, 2014. Reproductive biomedicine online 2017;35: 287-295.	Register - Latin American data
86	Zhou Z, Chen L, Wu H, Zheng D, Li R, Mol BW, Qiao J. Assisted reproductive technology in Beijing, 2013-2015. Reproductive biomedicine online 2018;37: 521-532.	Register - Chinese register
87	Zhu D, Zhang J, Cao S, Zhang J, Heng BC, Huang M, Ling X, Duan T, Tong GQ. Vitrified-warmed blastocyst transfer cycles yield higher pregnancy and implantation rates compared with fresh blastocyst transfer cycles--time for a new embryo transfer strategy? Fertility and sterility 2011;95: 1691-1695.	Frozen vs. frest ET

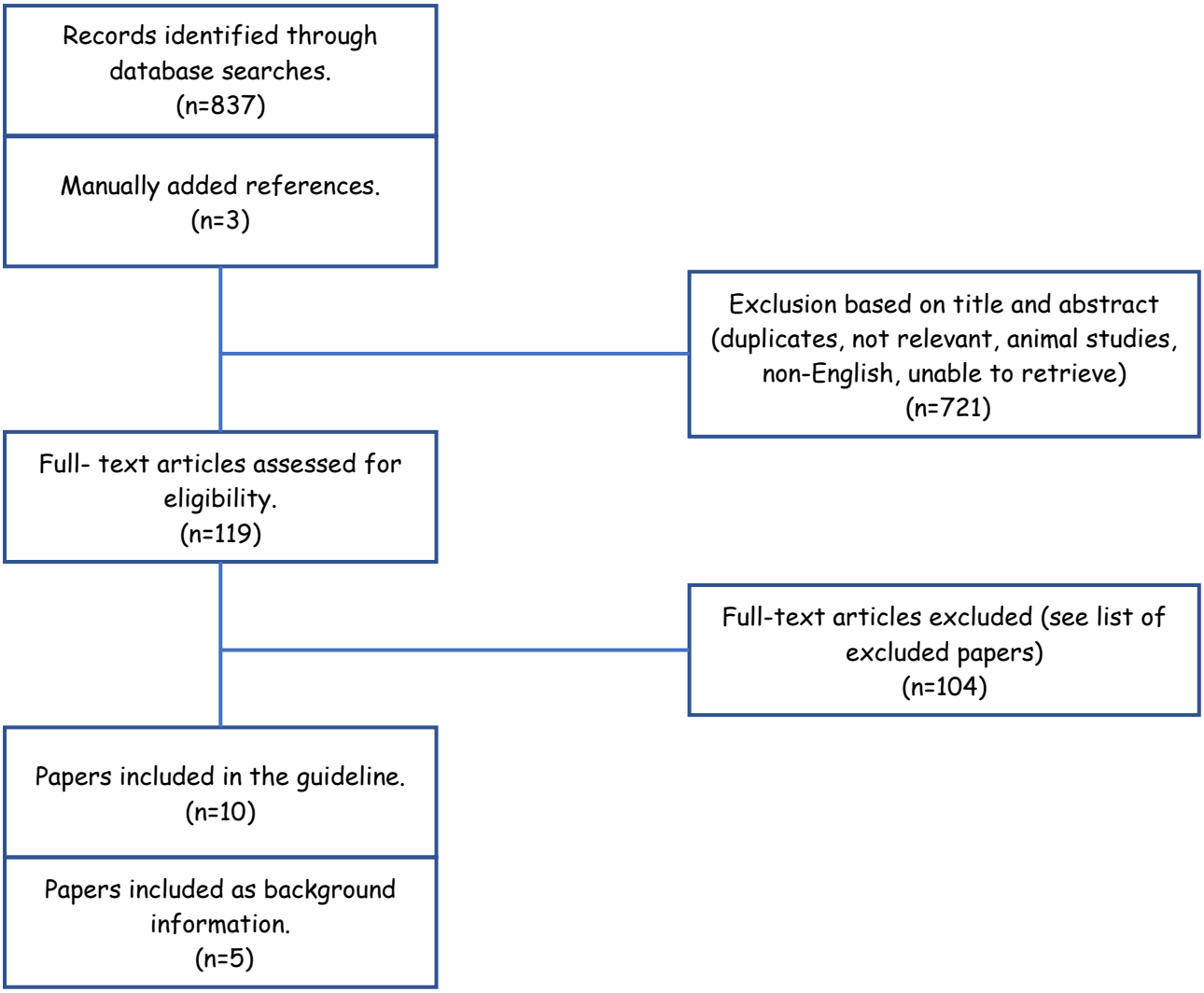
PICO 21: In any patient undergoing ART, should the transfer of more than two embryos with embryo reduction after implantation be applied considering the risks of the procedure?

Search strings

PUBMED	("Embryo Transfer"[Mesh] AND "Pregnancy Reduction, Multifetal"[Mesh] OR “embryo reduction” OR “vanishing” OR “Fetal reduction” OR “Selective reduction” OR “multiple pregnancy reduction” OR “multifetal pregnancy reduction”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth rate”)OR (“Multiple pregnancy rate” OR “multiple pregnancy percentage” OR “multiple birth* rate” OR “multiple birth* percentage”) OR ("premature infant" OR "premature newborn" OR prematurity OR “preterm infant” OR “neonatal prematurity” OR “preterm birth” OR neonate*) OR ("Maternal Death" OR “maternal morbidity”) OR ("Child mortality" OR “child death” OR “child morbidity” OR "Infant Death" OR “infant mortality” OR “infant morbidity” OR “newborn death” OR “newborn morbidity” OR “newborn morbidity” OR “perinatal morbidity” OR “perinatal death” OR “perinatal death”))
COCHRANE	("Embryo Transfer"[Mesh] AND "Pregnancy Reduction, Multifetal"[Mesh] OR “embryo reduction” OR “vanishing” OR “Fetal reduction” OR “Selective reduction” OR “multiple pregnancy reduction” OR “multifetal pregnancy reduction”) AND ("Pregnancy Outcome"[Mesh] OR ("Live Birth” OR “Live birth rate” OR LBR OR ”live birth percentage”) OR (“Cumulative live birth rate” OR cLBR* OR “cumulative multiple birth

	rate")OR ("Multiple pregnancy rate" OR "multiple pregnancy percentage" OR "multiple birth* rate" OR "multiple birth* percentage") OR ("premature infant" OR "premature newborn" OR prematurity OR "preterm infant" OR "neonatal prematurity" OR "preterm birth" OR neonate*) OR ("Maternal Death" OR "maternal morbidity") OR ("Child mortality" OR "child death" OR "child morbidity" OR "Infant Death" OR "infant mortality" OR "infant morbidity" OR "newborn death" OR "newborn morbidity" OR "newborn morbidity" OR "perinatal morbidity" OR "perinatal death" OR "perinatal death"))

Flowchart



List of excluded studies

Nr	Reference	Exclusion criteria
1	Abdelhafez MS, Abdelrazik MM, Badawy A. Early fetal reduction to twin versus prophylactic cervical cerclage for triplet pregnancies conceived with assisted reproductive techniques. Taiwanese journal of obstetrics & gynecology 2018;57: 95-99.	Relevant intervention is not included
2	Abel JS, Flöck A, Berg C, Gembruch U, Geipel A. Expectant management versus multifetal pregnancy reduction in higher order multiple pregnancies containing a monochorionic pair and a review of the literature. Archives of gynecology and obstetrics 2016;294: 1167-1173.	Relevant patients are not included, or only as subgroup
3	Alexander JM, Hammond KR, Steinkampf MP. Multifetal reduction of high-order multiple pregnancy: comparison of obstetrical outcome with nonreduced twin gestations. Fertility and sterility 1995;64: 1201-1203.	Relevant patients are not included, or only as subgroup
4	Almog B, Levin I, Wagman I, Kapustiansky R, Lessing JB, Amit A, Azem F. Adverse obstetric outcome for the vanishing twin syndrome. Reproductive biomedicine online 2010;20: 256-260.	Relevant intervention is not included

5	AlShelaly UE, Al-Mousa NH, Kurdi WI. Obstetric outcomes in reduced and non-reduced twin pregnancies. A single hospital experience. Saudi medical journal 2015;36: 1122-1125.	Relevant patients are not included, 6or only as subgroup
6	Antsaklis A, Anastasakis E. Selective reduction in twins and multiple pregnancies. Journal of perinatal medicine 2011;39: 15-21.	Relevant outcomes are not assessed or inappropriately assessed
7	Antsaklis A, Souka AP, Daskalakis G, Papantoniou N, Koutra P, Kavalakis Y, Mesogitis S. Embryo reduction versus expectant management in triplet pregnancies. The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet 2004;16: 219-222.	Relevant patients are not included, or only as subgroup
8	Antsaklis AJ, Drakakis P, Vlazakis GP, Michalas S. Reduction of multifetal pregnancies to twins does not increase obstetric or perinatal risks. Human reproduction (Oxford, England) 1999;14: 1338-1340.	Relevant patients are not included, or only as subgroup
9	Armour KL, Callister LC. Prevention of triplets and higher order multiples: trends in reproductive medicine. The Journal of perinatal & neonatal nursing 2005;19: 103-111.	Relevant outcomes are not assessed or inappropriately assessed
10	Ata B, Rasillo LJ, Sukhdeo S, Son WY, Tan SL, Dahan MH. Obstetric outcomes of IVF trichorionic triamniotic triplets which are spontaneously or electively reduced to twins. Journal of assisted reproduction and genetics 2011;28: 1217-1222.	Relevant outcomes are not assessed or inappropriately assessed
11	Bardin R, Gupta M, Greenberg G, Nandrajog A, Tenenbaum-Gavish K, Gupta N, Perlman S, Shmueli A, Hadar E. Fetal reduction from twin to singleton gestation: A meta-analysis. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics 2022;158: 260-269.	Relevant patients are not included, or only as subgroup
12	Bergh C, Möller A, Nilsson L, Wikland M. Obstetric outcome and psychological follow-up of pregnancies after embryo reduction. Human reproduction (Oxford, England) 1999;14: 2170-2175.	relevant patients are not included or only as subgroup
13	Berkowitz RL. Ethical issues involving multifetal pregnancies. The Mount Sinai journal of medicine, New York 1998;65: 185-190; discussion 215-123.	Relevant outcomes are not assessed or inappropriately assessed
14	Berkowitz RL, Lynch L, Stone J, Alvarez M. The current status of multifetal pregnancy reduction. American journal of obstetrics and gynecology 1996;174: 1265-1272.	
15	Bhandari S, Agrawal P, Ganguly I, Singh A, Gupta N. Perinatal Outcome in Assisted Reproductive Pregnancies: Comparative Analysis of Reduced versus Unreduced Gestation. International journal of reproductive medicine 2016;2016: 7504609.	Relevant patients are not included, or only as subgroup
16	Blickstein I, Keith LG. The decreased rates of triplet births: temporal trends and biologic speculations. American journal of obstetrics and gynecology 2005;193: 327-331.	Relevant intervention is not included
17	Boulot P, Hedon B, Pelliccia G, Peray P, Laffargue F, Viala JL. Effects of selective reduction in triplet gestation: a comparative study of 80 cases managed with or without this procedure. Fertility and sterility 1993;60: 497-503.	Relevant patients are not included, or only as subgroup
18	Boulot P, Vignal J, Vergnes C, Dechaud H, Faure JM, Hedon B. Multifetal reduction of triplets to twins: a prospective comparison of pregnancy outcome. Human reproduction (Oxford, England) 2000;15: 1619-1623.	Relevant patients are not included, or only as subgroup
19	Brambati B, Tului L. First trimester fetal reduction: its role in the management of twin and higher order multiple pregnancies. Human reproduction update 1995;1: 397-408.	Relevant outcomes are not assessed or inappropriately assessed
20	Cai P, Ouyang Y, Gong F, Li X. Pregnancy outcomes of dichorionic triamniotic triplet pregnancies after in vitro fertilization-embryo transfer: multifoetal pregnancy reduction versus expectant management. BMC pregnancy and childbirth 2020;20: 165.	
21	Cheang CU, Huang LS, Lee TH, Liu CH, Shih YT, Lee MS. A comparison of the outcomes between twin and reduced twin pregnancies produced through assisted reproduction. Fertility and sterility 2007;88: 47-52.	Relevant patients are not included, or only as subgroup
22	Cihangir Yılanlıoglu N, Semiz A, Arisoy R, Kahraman S, Arslan Gürkan A. The outcome of the multifetal pregnancy reduction procedures in a single centre: A report of 202 completed cases. European journal of obstetrics, gynecology, and reproductive biology 2018;230: 22-27.	Relevant patients are not included, or only as subgroup
23	Coffler MS, Kol S, Drugan A, Itskovitz-Eldor J. Early transvaginal embryo aspiration: a safer method for selective reduction in high order multiple gestations. Human reproduction (Oxford, England) 1999;14: 1875-1878.	Relevant patients are not included, or only as subgroup
24	Cohen J. How to avoid multiple pregnancies in assisted reproduction. Human reproduction (Oxford, England) 1998;13 Suppl 3: 197-214; discussion 215-198.	Relevant outcomes are not assessed or inappropriately assessed
25	Collins J. Global epidemiology of multiple birth. Reproductive biomedicine online 2007;15 Suppl 3: 45-52.	Relevant intervention is not included

26	Dodd JM, Dowswell T, Crowther CA. Reduction of the number of fetuses for women with a multiple pregnancy. The Cochrane database of systematic reviews 2015: Cd003932.	
27	Donner C, de Maertelaer V, Rodesch F. Multifetal pregnancy reduction: comparison of obstetrical results with spontaneous twin gestations. European journal of obstetrics, gynecology, and reproductive biology 1992;44: 181-184.	Relevant patients are not included, or only as subgroup
28	Drugan A, Ulanovsky I, Burke Y, Blazer S, Weissman A. Fetal reduction in triplet gestations: twins still fare better. The Israel Medical Association journal : IMAJ 2013;15: 745-747.	Relevant patients are not included, or only as subgroup
29	Drugan A, Weissman A. Multi-fetal pregnancy reduction (MFPR) to twins or singleton - medical justification and ethical slippery slope. Journal of perinatal medicine 2017;45: 181-184.	
30	Evans MI, Berkowitz RL, Wapner RJ, Carpenter RJ, Goldberg JD, Ayoub MA, Horenstein J, Dommergues M, Brambati B, Nicolaides KH et al. Improvement in outcomes of multifetal pregnancy reduction with increased experience. American journal of obstetrics and gynecology 2001;184: 97-103.	Study is included in meta-analysis / More recent meta-analysis available
31	Evans MI, Ciorica D, Britt DW. Do reduced multiples do better? Best practice & research Clinical obstetrics & gynaecology 2004;18: 601-612.	Relevant patients are not included, or only as subgroup
32	Evans MI, Ciorica D, Britt DW, Fletcher JC. Update on selective reduction. Prenatal diagnosis 2005;25: 807-813.	Relevant outcomes are not assessed or inappropriately assessed
33	Evans MI, Hume RF, Jr., Polak S, Yaron Y, Drugan A, Diamond MP, Johnson MP. The geriatric gravida: multifetal pregnancy reduction, donor eggs, and aggressive infertility treatments. American journal of obstetrics and gynecology 1997;177: 875-878.	Relevant outcomes are not assessed or inappropriately assessed
34	Evans MI, Littmann L, King M, Fletcher JC. Multiple gestation: the role of multifetal pregnancy reduction and selective termination. Clinics in perinatology 1992;19: 345-357.	Relevant outcomes are not assessed or inappropriately assessed
35	Fasouliotis SJ, Schenker JG. Multifetal pregnancy reduction: a review of the world results for the period 1993-1996. European journal of obstetrics, gynecology, and reproductive biology 1997;75: 183-190.	Relevant patients are not included, or only as subgroup
36	Gao L, Xu QQ, Wang S, Xia YQ, Zhao XR, Wu Y, Hua RY, Sun JL, Wang YL. Correlation analysis of adverse outcomes for the selective reduction of twin pregnancies. BMC pregnancy and childbirth 2022;22: 417.	
37	Gerris J. The near elimination of triplets in IVF. Reproductive biomedicine online 2007;15 Suppl 3: 40-44.	Relevant intervention is not included
38	Greenberg G, Bardin R, Danieli-Gruber S, Tenenbaum-Gavish K, Shmueli A, Krispin E, Oron G, Wiznitzer A, Hadar E. Pregnancy outcome following fetal reduction from dichorionic twins to singleton gestation. BMC pregnancy and childbirth 2020;20: 389.	
39	Gutiérrez Nájar A, Stern Colin YNJ, Gonzalez Panzzi ME, Orbea Travez M. Pregnancy and birth after assisted reproduction. Reproductive biomedicine online 2002;5: 78-88.	Relevant intervention is not included
40	Haas J, Hourvitz A, Dor J, Elizur S, Yinon Y, Barzilay E, Shulman A. Perinatal outcome of twin pregnancies after early transvaginal multifetal pregnancy reduction. Fertility and sterility 2014;101: 1344-1348.	Relevant patients are not included, or only as subgroup
41	Haas J, Hourvitz A, Dor J, Yinon Y, Elizur S, Mazaki-Tovi S, Barzilay E, Shulman A. Pregnancy outcome of early multifetal pregnancy reduction: triplets to twins versus triplets to singletons. Reproductive biomedicine online 2014;29: 717-721.	Relevant patients are not included, or only as subgroup
42	Herlihy N, Naqvi M, Romero J, Gupta S, Monteagudo A, Rebarber A, Fox NS. Multifetal Pregnancy Reduction of Trichorionic Triplet Gestations: What is the Benefit? American journal of perinatology 2017;34: 1417-1423.	Relevant patients are not included, or only as subgroup
43	Hershko-Klement A, Lipitz S, Wiser A, Berkovitz A. Reduced versus nonreduced twin pregnancies: obstetric performance in a cohort of interventional conceptions. Fertility and sterility 2013;99: 163-167.	Relevant patients are not included, or only as subgroup
44	Hessami K, Evans MI, Nassr AA, Espinoza J, Donepudi RV, Cortes MS, Krispin E, Mostafaei S, Belfort MA, Shamshirsaz AA. Fetal reduction of triplet pregnancies to twins vs singletons: a meta-analysis of survival and pregnancy outcome. American journal of obstetrics and gynecology 2022;227: 430-439.e435.	
45	Hwang JL, Pan HS, Huang LW, Lee CY, Tsai YL. Comparison of the outcomes of primary twin pregnancies and twin pregnancies following fetal reduction. Archives of gynecology and obstetrics 2002;267: 60-63.	Relevant patients are not included, or only as subgroup
46	Ibérico G, Navarro J, Blasco L, Simón C, Pellicer A, Remohí J. Embryo reduction of multifetal pregnancies following assisted reproduction treatment: a modification of the transvaginal ultrasound-guided technique. Human reproduction (Oxford, England) 2000;15: 2228-2233.	Relevant patients are not included, or only as subgroup
47	Jirsova S, Mardesic T, Muller P, Huttelova R, Zvarova J, Jirkovsky M. Multi-fetal pregnancy reduction does not influence perinatal results in twin pregnancies. Twin research : the official journal of the International Society for Twin Studies 2001;4: 422-425.	Relevant patients are not included, or only as subgroup
48	Kadhel P, Olivennes F, Fernandez H, Vial M, Frydman R. Are there still obstetric and perinatal benefits for selective embryo reduction of triplet pregnancies? Human reproduction (Oxford, England) 1998;13: 3555-3559.	Relevant patients are not included, or only as subgroup

49	Kahraman S, Vicdan K, Nuhoglu A, Danişman N, Işik Z, Ozgün OD, Biberoglu K. Outcomes of multifetal pregnancy reduction in multiple pregnancies achieved by intracytoplasmic sperm injection using ejaculated, testicular, or epididymal sperm. Gynecologic and obstetric investigation 1997;44: 1-5.	Relevant patients are not included, or only as subgroup
50	Kaul A, Prasad S, Anand K, Arora S, Sharma A. Elective Fetal Reduction in Dichorionic Diamniotic Twin Pregnancies on Parental Request: A Single-Centre Experience. Fetal diagnosis and therapy 2021;48: 272-278.	
51	Koopersmith TB, Lindheim SR, Lobo RA, Paulson RJ, Sauer MV. Outcomes of high-order multiple implantations in women undergoing ovum donation. The Journal of maternal-fetal medicine 1997;6: 268-272.	Relevant intervention is not included
52	Kuhn-Beck F, Moutel G, Weingertner AS, Kohler M, Hornecker F, Hunsinger MC, Kohler A, Mager C, Neumann M, Nisand I et al. Fetal reduction of triplet pregnancy: one or two? Prenatal diagnosis 2012;32: 122-126.	Relevant patients are not included, or only as subgroup
53	Leondires MP, Ernst SD, Miller BT, Scott RT, Jr. Triplets: outcomes of expectant management versus multifetal reduction for 127 pregnancies. American journal of obstetrics and gynecology 2000;183: 454-459.	
54	Lin H, Wen Y, Li Y, Chen X, Yang D, Zhang Q. Early fetal reduction of dichorionic triplets to dichorionic twin or singleton pregnancies: a retrospective study. Reproductive biomedicine online 2016;32: 490-495.	Relevant patients are not included, or only as subgroup
55	Lipitz S, Reichman B, Uval J, Shalev J, Achiron R, Barkai G, Lusky A, Mashiach S. A prospective comparison of the outcome of triplet pregnancies managed expectantly or by multifetal reduction to twins. American journal of obstetrics and gynecology 1994;170: 874-879.	Relevant patients are not included, or only as subgroup
56	Liu S, Li G, Wang C, Zhou P, Wei Z, Song B. Pregnancy and obstetric outcomes of dichorionic and trichorionic triamniotic triplet pregnancy with multifetal pregnancy reduction: a retrospective analysis study. BMC pregnancy and childbirth 2022;22: 280.	
57	Luke B, Brown MB, Nugent C, Gonzalez-Quintero VH, Witter FR, Newman RB. Risk factors for adverse outcomes in spontaneous versus assisted conception twin pregnancies. Fertility and sterility 2004;81: 315-319.	Relevant patients are not included, or only as subgroup
58	Luke B, Brown MB, Wantman E, Forestieri NE, Browne ML, Fisher SC, Yazdy MM, Ethen MK, Canfield MA, Nichols HB et al. Risks of nonchromosomal birth defects, small-for-gestational age birthweight, and prematurity with in vitro fertilization: effect of number of embryos transferred and plurality at conception versus at birth. Journal of assisted reproduction and genetics 2021;38: 835-846.	
59	Luo L, Fan XZ, Jie HY, Gao Y, Chen M, Zhou C, Wang Q. Is it worth reducing twins to singletons after IVF-ET? A retrospective cohort study using propensity score matching. Acta obstetricia et gynecologica Scandinavica 2019;98: 1274-1281.	
60	Mantzavinos T, Kanakas N, Dimitriadou F, Arvaniti K, Voutsina K, Prapa A. Triplet pregnancy and fetal reduction counselling. Clinical and experimental obstetrics & gynecology 1996;23: 48-50.	Relevant outcomes are not assessed or inappropriately assessed
61	Melgar CA, Rosenfeld DL, Rawlinson K, Greenberg M. Perinatal outcome after multifetal reduction to twins compared with nonreduced multiple gestations. Obstetrics and gynecology 1991;78: 763-767.	
62	Messinis IE, Domali E. What is the most relevant standard of success in assisted reproduction? Should BESST really be the primary endpoint for assisted reproduction? Human reproduction (Oxford, England) 2004;19: 1933-1935.	Relevant intervention is not included
63	Murray SR, Norman JE. Multiple pregnancies following assisted reproductive technologies--a happy consequence or double trouble? Seminars in fetal & neonatal medicine 2014;19: 222-227.	Relevant intervention is not included
64	Običan S, Brock C, Berkowitz R, Wapner RJ. Multifetal Pregnancy Reduction. Clinical obstetrics and gynecology 2015;58: 574-584.	Relevant intervention is not included
65	Okyay E, Altunyurt S, Soysal D, Kaymak O, Soysal S, Danisman N, Gulekli B. A comparative study of obstetric outcomes in electively or spontaneously reduced triplet pregnancies. Archives of gynecology and obstetrics 2014;290: 177-184.	
66	Ombelet W, De Sutter P, Van der Elst J, Martens G. Multiple gestation and infertility treatment: registration, reflection and reaction--the Belgian project. Human reproduction update 2005;11: 3-14.	Relevant intervention is not included
67	Ouyang Y, Cai P, Gong F, Lin G, Qin J, Li X. The risk of twin pregnancies should be minimized in patients with a unicornuate uterus undergoing IVF-ET. Scientific reports 2020;10: 5571.	Relevant patients are not included, or only as subgroup
68	Papageorghiou AT, Avgidou K, Bakoulas V, Sebire NJ, Nicolaides KH. Risks of miscarriage and early preterm birth in trichorionic triplet pregnancies with embryo reduction versus expectant management: new data and systematic review. Human reproduction (Oxford, England) 2006;21: 1912-1917.	Relevant intervention is not included
69	Papageorghiou AT, Liao AW, Skentou C, Sebire NJ, Nicolaides KH. Trichorionic triplet pregnancies at 10-14 weeks: outcome after embryo reduction compared to expectant management. The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstet 2002;11: 307-312.	Relevant patients are not included, or only as subgroup
70	Papiernik E, Grangé G, Zeitlin J. Should multifetal pregnancy reduction be used for prevention of preterm deliveries in triplet or higher order multiple pregnancies? Journal of perinatal medicine 1998;26: 365-370.	Relevant intervention is not included
71	Pennings G. Avoiding multiple pregnancies in ART: multiple pregnancies: a test case for the moral quality of medically assisted reproduction. Human reproduction (Oxford, England) 2000;15: 2466-2469.	Relevant intervention is not included
72	Pinborg A, Wennerholm UB, Romundstad LB, Loft A, Aittomaki K, Söderström-Anttila V, Nygren KG, Hazekamp J, Bergh C. Why do singletons conceived after assisted reproduction technology have adverse perinatal outcome? Systematic review and meta-analysis. Human reproduction update 2013;19: 87-104.	Relevant intervention is not included

73	Rådestad A, Bui TH, Nygren KG. Multifetal pregnancy reduction in Sweden. Utilization rate and pregnancy outcome (1986-1992). Acta obstetricia et gynecologica Scandinavica 1994;73: 403-406.	Relevant patients are not included, or only as subgroup
74	Radestad A, Bui TH, Nygren KG, Koskimies A, Petersen K. The utilization rate and pregnancy outcome of multifetal pregnancy reduction in the Nordic countries. Acta obstetricia et gynecologica Scandinavica 1996;75: 651-653.	Relevant patients are not included, or only as subgroup
75	Raffé-Devine J, Somerset DA, Metcalfe A, Cairncross ZF. Maternal, Fetal, and Neonatal Outcomes of Elective Fetal Reduction Among Multiple Gestation Pregnancies: A Systematic Review. Journal of obstetrics and gynaecology Canada : JOGC = Journal d'obstetrique et gynecologie du Canada : JOGC 2022;44: 60-70.e12.	
76	Rand L, Eddleman KA, Stone J. Long-term outcomes in multiple gestations. Clinics in perinatology 2005;32: 495-513, viii.	Relevant intervention is not included
77	Razaz N, Avitan T, Ting J, Pressey T, Joseph KS. Perinatal outcomes in multifetal pregnancy following fetal reduction. CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne 2017;189: E652-e658.	Relevant patients are not included, or only as subgroup
78	Reh A, Fino E, Krey L, Berkeley A, Noyes N, Grifo J. Optimizing embryo selection with day 5 transfer. Fertility and sterility 2010;93: 609-615.	Relevant intervention is not included
79	Roest J, van Heusden AM, Verhoeff A, Mous HV, Zeilmaker GH. A triplet pregnancy after in vitro fertilization is a procedure-related complication that should be prevented by replacement of two embryos only. Fertility and sterility 1997;67: 290-295.	Relevant intervention is not included
80	Salat-Baroux J, Aknin J, Antoine JM, Alvarez S, Cornet D, Plachot M, Mandelbaum J. Is there an indication for embryo reduction? Human reproduction (Oxford, England) 1992;7 Suppl 1: 67-72.	Relevant intervention is not included
81	Salat-Baroux J, Antoine JM. Multiple pregnancies: the price to pay. European journal of obstetrics, gynecology, and reproductive biology 1996;65 Suppl: S17-18.	Relevant patients are not included, or only as subgroup
82	Sarac Sivrikoz T, Demir O, Kalelioglu IH, Has R, Karakas Paskal E, Kundakci Ozdemir P, Yuksel A. The effects of early or late multifetal reduction procedure on perinatal outcomes in multiple pregnancies reduced to twins or singletons: A single tertiary center experience. European journal of obstetrics, gynecology, and reproductive biology 2022;270: 195-200.	
83	Sauer MV, Paulson RJ, Lobo RA. Oocyte donation to women of advanced reproductive age: pregnancy results and obstetrical outcomes in patients 45 years and older. Human reproduction (Oxford, England) 1996;11: 2540-2543.	Relevant patients are not included, or only as subgroup
84	Sebire NJ, D'Ercole C, Sepulveda W, Hughes K, Nicolaides KH. Effects of embryo reduction from trichorionic triplets to twins. British journal of obstetrics and gynaecology 1997;104: 1201-1203.	Relevant patients are not included, or only as subgroup
85	Sebire NJ, Sherod C, Abbas A, Snijders RJ, Nicolaides KH. Preterm delivery and growth restriction in multifetal pregnancies reduced to twins. Human reproduction (Oxford, England) 1997;12: 173-175.	Relevant intervention is not included
86	Shiva M, Mohammadi Yeganeh L, Mirzaagha E, Chehrazi M, Bagheri Lankarani N. Comparison of the outcomes between reduced and nonreduced triplet pregnancies achieved by Assisted Reproductive Technology. The Australian & New Zealand journal of obstetrics & gynaecology 2014;54: 424-427.	
87	Silver RK, Helfand BT, Russell TL, Ragin A, Sholl JS, MacGregor SN. Multifetal reduction increases the risk of preterm delivery and fetal growth restriction in twins: a case-control study. Fertility and sterility 1997;67: 30-33.	Relevant patients are not included, or only as subgroup
88	Skiadas CC, Missmer SA, Benson CB, Acker D, Racowsky C. Impact of selective reduction of the monochorionic pair in in vitro fertilization triplet pregnancies on gestational length. Fertility and sterility 2010;94: 2930-2931.	Relevant patients are not included, or only as subgroup
89	Skiadas CC, Missmer SA, Benson CB, Acker D, Racowsky C. Spontaneous reduction before 12 weeks' gestation and selective reduction similarly extend time to delivery in in vitro fertilization of trichorionic-triamniotic triplets. Fertility and sterility 2011;95: 596-599.	Relevant patients are not included, or only as subgroup
90	Skupski DW, Nelson S, Kowalik A, Polaneczky M, Smith-Levitin M, Hutson JM, Rosenwaks Z. Multiple gestations from in vitro fertilization: successful implantation alone is not associated with subsequent preeclampsia. American journal of obstetrics and gynecology 1996;175: 1029-1032.	Relevant patients are not included, or only as subgroup
91	Smith-Levitin M, Kowalik A, Birnholz J, Skupski DW, Hutson JM, Chervenak FA, Rosenwaks Z. Selective reduction of multifetal pregnancies to twins improves outcome over nonreduced triplet gestations. American journal of obstetrics and gynecology 1996;175: 878-882.	Relevant intervention is not included
92	Smith-Levitin M, Skupski DW, Chervenak FA. Multifetal pregnancies. Current opinion in obstetrics & gynecology 1995;7: 465-471.	Relevant patients are not included, or only as subgroup
93	Souter I, Goodwin TM. Decision making in multifetal pregnancy reduction for triplets. American journal of perinatology 1998;15: 63-71.	Relevant intervention is not included
94	Stone J, Eddleman K. Multifetal pregnancy reduction. Current opinion in obstetrics & gynecology 2000;12: 491-496.	Relevant intervention is not included
95	Stone J, Ferrara L, Kamrath J, Getrajdman J, Berkowitz R, Moshier E, Eddleman K. Contemporary outcomes with the latest 1000 cases of multifetal pregnancy reduction (MPR). American journal of obstetrics and gynecology 2008;199: 406.e401-404.	Relevant patients are not included, or only as subgroup

96	Torok O, Lapinski R, Salafia CM, Bernasko J, Berkowitz RL. Multifetal pregnancy reduction is not associated with an increased risk of intrauterine growth restriction, except for very-high-order multiples. American journal of obstetrics and gynecology 1998;179: 221-225.	Relevant patients are not included, or only as subgroup
97	Tse WT, Law LW, Sahota DS, Leung TY, Cheng YK. Triplet pregnancy with fetal reduction: experience in Hong Kong. Hong Kong medical journal = Xianggang yi xue za zhi 2017;23: 326-332.	Relevant patients are not included, or only as subgroup
98	van de Mheen L, Everwijn SM, Knapen MF, Oepkes D, Engels M, Manten GT, Zondervan H, Wirjosoekarto SA, van Vugt JM, Erwich JJ et al. The effectiveness of multifetal pregnancy reduction in trichorionic triplet gestation. American journal of obstetrics and gynecology 2014;211: 536.e531-536.	Relevant patients are not included, or only as subgroup
99	Vauthier-Brouzes D, Lefebvre G. Selective reduction in multifetal pregnancies: technical and psychological aspects. Fertility and sterility 1992;57: 1012-1016.	Relevant intervention is not included
100	Wimalasundera RC. Selective reduction and termination of multiple pregnancies. Seminars in fetal & neonatal medicine 2010;15: 327-335.	Relevant intervention is not included
101	Wimalasundera RC, Trew G, Fisk NM. Reducing the incidence of twins and triplets. Best practice & research Clinical obstetrics & gynaecology 2003;17: 309-329.	Relevant intervention is not included
102	Yaron Y, Bryant-Greenwood PK, Dave N, Moldenhauer JS, Kramer RL, Johnson MP, Evans MI. Multifetal pregnancy reductions of triplets to twins: comparison with nonreduced triplets and twins. American journal of obstetrics and gynecology 1999;180: 1268-1271.	Relevant patients are not included, or only as subgroup
103	Zemet R, Haas J, Bart Y, Barzilay E, Zloto K, Argaman N, Schwartz N, Weisz B, Yinon Y, Mazaki-Tovi S et al. Pregnancy outcome after multifetal pregnancy reduction of triplets to twins versus reduction to singletons. Reproductive biomedicine online 2020;40: 445-452.	Relevant patients are not included, or only as subgroup
104	Zhang YL, Wang XY, Wang F, Su YC, Sun YP. Clinical analysis of spontaneous pregnancy reduction in the patients with multiple pregnancies undergoing in vitro fertilization/intracytoplasmic sperm injection-embryo transfer. International journal of clinical and experimental medicine 2015;8: 4575-4580.	Relevant patients are not included, or only as subgroup

PICO 22. Which issues are crucial for decision-making regarding the number of embryos to transfer and how should they be discussed with the patients? (NARRATIVE)

Search strings

This question is a narrative question. The section was prepared based on expert opinion and selected papers from the literature searches in addition to the survey results. 18 papers were included in the narrative section.