
Annex 7: Literature study report

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Q1. How should the care for women undergoing FP be organized?

Search strings

| DATABASE | Search string |
|----------|---|
| PUBMED | ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Care" OR "Oncofertility program" OR "Organisation" OR "Multidisciplinary" OR "patient navigator" OR "organization of care" OR "referral pathway" OR "Patient Care Team"[Mesh] OR "Patient Navigation"[Mesh]) |
| COCHRANE | ("Fertility Preservation") AND ("Care" OR "Oncofertility program" OR "Organisation" OR "Multidisciplinary" OR "patient navigator" OR "organization of care" OR "referral pathway" OR "Patient Care Team" OR "Patient Navigation") |

This question is a narrative question. The search resulted in 628 references. The most relevant papers were selected and combined with expert opinion of the GDG members and other papers suggested by the GDG members.

Q2. Which information needs to be provided to women at risk of infertility?

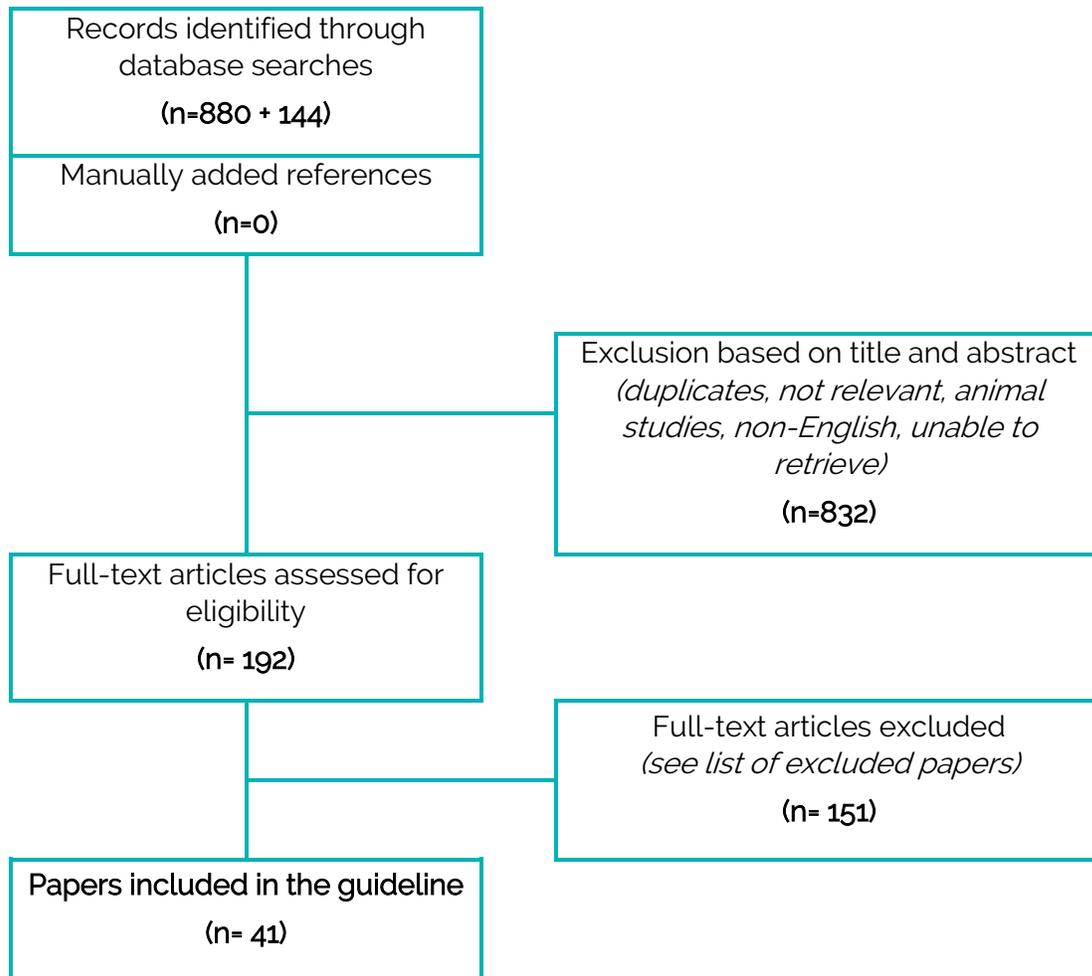
This question was answered as a narrative question, based on the results of the literature search for Question 3. Relevant references were selected and combined with expert opinion from the GDG members, and information from additional papers suggested by the GDG members.

Q3. How should information on fertility preservation options be provided to patients?

Search strings

| DATABASE | Search string |
|-----------------|--|
| PUBMED | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Consumer Health Information"[Mesh] OR "health information" OR information OR "information provision" OR "Written information" OR "leaflet" OR "Hot-line" OR "help-line" OR "helpline" OR hotline OR Counseling OR "personal contact" OR "Webpages" OR "shared decision making" OR "Informed consent" OR "Informed Consent"[Mesh] OR "Counseling"[Mesh] OR "Hotlines"[Mesh] OR "Decision Making"[Mesh] OR "Consent Forms"[Mesh] OR "Decision Support Techniques"[Mesh] OR "Clinical Decision-Making"[Mesh] OR "Decision Analysis" OR "Decision Support" OR "Decision Aid" OR "Decision Support Systems, Clinical"[Mesh]) |
| PUBMED | ("Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis") AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Consumer Health Information"[Mesh] OR "health information" OR information OR "information provision" OR "Written information" OR "leaflet" OR "Hot-line" OR "help-line" OR "helpline" OR hotline OR Counseling OR "personal contact" OR "Webpages" OR "shared decision making" OR "Informed consent" OR "Informed Consent"[Mesh] OR "Counseling"[Mesh] OR "Hotlines"[Mesh] OR "Decision Making"[Mesh] OR "Consent Forms"[Mesh] OR "Decision Support Techniques"[Mesh] OR "Clinical Decision-Making"[Mesh] OR "Decision Analysis" OR "Decision Support" OR "Decision Aid" OR "Decision Support Systems, Clinical"[Mesh]) |
| PUBMED | ("Transgender Persons"[Mesh] OR Transgender OR Transsexual) AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Consumer Health Information"[Mesh] OR "health information" OR information OR "information provision" OR "Written information" OR "leaflet" OR "Hot-line" OR "help-line" OR "helpline" OR hotline OR Counseling OR "personal contact" OR "Webpages" OR "shared decision making" OR "Informed consent" OR "Informed Consent"[Mesh] OR "Counseling"[Mesh] OR "Hotlines"[Mesh] OR "Decision Making"[Mesh] OR "Consent Forms"[Mesh] OR "Decision Support Techniques"[Mesh] OR "Clinical Decision-Making"[Mesh] OR "Decision Analysis" OR "Decision Support" OR "Decision Aid" OR "Decision Support Systems, Clinical"[Mesh]) |
| PUBMED | ("anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing") AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Consumer Health Information"[Mesh] OR "health information" OR information OR "information provision" OR "Written information" OR "leaflet" OR "Hot-line" OR "help-line" OR "helpline" OR hotline OR Counseling OR "personal contact" OR "Webpages" OR "shared decision making" OR "Informed consent" OR "Informed Consent"[Mesh] OR "Counseling"[Mesh] OR "Hotlines"[Mesh] OR "Decision Making"[Mesh] OR "Consent Forms"[Mesh] OR "Decision Support Techniques"[Mesh] OR "Clinical Decision-Making"[Mesh] OR "Decision Analysis" OR "Decision Support" OR "Decision Aid" OR "Decision Support Systems, Clinical"[Mesh]) |
| PUBMED | ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Consumer Health Information"[Mesh] OR "health information" OR information OR "information provision" OR "Written information" OR "leaflet" OR "Hot-line" OR "help-line" OR "helpline" OR hotline OR Counseling OR "personal contact" OR "Webpages" OR "shared decision making" OR "Informed consent" OR "Informed Consent"[Mesh] OR "Counseling"[Mesh] OR "Hotlines"[Mesh] OR "Decision Making"[Mesh] OR "Consent Forms"[Mesh] OR "Decision Support Techniques"[Mesh] OR "Clinical Decision-Making"[Mesh] OR "Decision Analysis" OR "Decision Support" OR "Decision Aid" OR "Decision Support Systems, Clinical"[Mesh]) NOT SEARCH 1-4 |
| COCHRANE merged | ("Fertility Preservation") AND ("health information" OR information OR "information provision" OR "Written information" OR "leaflet" OR "Hot-line" OR "help-line" OR "helpline" OR hotline OR Counseling OR "personal contact" OR "Webpages" OR "shared decision making" OR "Informed consent" OR "Informed Consent" OR "Decision Making" OR "Consent Forms" OR "Decision Support Techniques" OR "Clinical Decision-Making" OR "Decision Analysis" OR "Decision Support" OR "Decision Aid") |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|--|--|
| Silva C, Almeida-Santos AT, Melo C, Rama ACR. Decision on Fertility Preservation in Cancer Patients: Development of Information Materials for Healthcare Professionals. <i>Journal of adolescent and young adult oncology</i> 2017;6: 353-357. | Relevant outcomes are not assessed or inappropriately assessed |
| Giles C. Young people with cancer lack clear information about preserving fertility. <i>BMJ (Clinical research ed)</i> 2017;356: i6790. | PubType: Letter |
| Benedict C, Thom B, D NF, Diotallevi D, E MP, N JR, Kelvin JF. Young adult female cancer survivors' unmet information needs and reproductive concerns contribute to decisional conflict regarding posttreatment fertility preservation. <i>Cancer</i> 2016;122: 2101-2109. | Relevant outcomes are not assessed or inappropriately assessed |
| Gupta AA, Edelstein K, Albert-Green A, D'Agostino N. Assessing information and service needs of young adults with cancer at a single institution: the importance of information on cancer diagnosis, fertility preservation, diet, and exercise. <i>Supportive care in cancer : official journal of the Multinational Association of Supportive Care in Cancer</i> 2013;21: 2477-2484. | Relevant outcomes are not assessed or inappropriately assessed |
| Karaoz B, Aksu H, Kucuk M. A qualitative study of the information needs of premenopausal women with breast cancer in terms of contraception, sexuality, early menopause, and fertility. <i>International journal of gynaecology and obstetrics</i> 2010;109: 118-120. | Relevant outcomes are not assessed or inappropriately assessed |
| Roher SI, Gibson J, Gibson BE, Gupta AA. Listening through narratives: using a narrative approach when discussing fertility preservation options with young cancer patients. <i>Current oncology (Toronto, Ont)</i> 2017;24: 10-15. | Description of a narrative approach to discuss FP |
| Vu JV, Llarena NC, Estevez SL, Moravek MB, Jeruss JS. Oncofertility program implementation increases access to fertility preservation options and assisted reproductive procedures for breast cancer patients. <i>Journal of surgical oncology</i> 2017;115: 116-121. | Relevant outcomes are not assessed or inappropriately assessed |
| Korse NS, Nicolai MP, Both S, Vleggeert-Lankamp CL, Elzevier HW. Discussing reproductive health in spinal care, part II: fertility issues. <i>European spine journal : official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society</i> 2016;25: 2945-2951. | Relevant outcomes are not assessed or inappropriately assessed |
| Nawroth F. Fertility preservation consultation for women with cancer: are we helping patients make high quality decisions? <i>Reproductive biomedicine online</i> 2013;27: 29-30. | Comment |
| Quinn GP, Vadaparampil ST, Gwede CK, Miree C, King LM, Clayton HB, Wilson C, Munster P. Discussion of fertility preservation with newly diagnosed patients: oncologists' views. <i>Journal of cancer survivorship : research and practice</i> 2007;1: 146-155. | Relevant outcomes are not assessed or inappropriately assessed |
| Anderson RA, Weddell A, Spoudeas HA, Douglas C, Shalet SM, Levitt G, Wallace WH. Do doctors discuss fertility issues before they treat young patients with cancer? <i>Human reproduction</i> 2008;23: 2246-2251. | Relevant outcomes are not assessed or inappropriately assessed |
| Quinn GP, Vadaparampil ST, Bell-Ellison BA, Gwede CK, Albrecht TL. Patient-physician communication barriers regarding fertility preservation among newly diagnosed cancer patients. <i>Social science & medicine</i> 2008;66: 784-789. | Narrative review |
| Peate M, Smith SK, Pye V, Hucker A, Stafford L, Oakman C, Chin-Lenn L, Shanahan K, Ratnayake Gamage N et al. Assessing the usefulness and acceptability of a low health literacy online decision aid about reproductive choices for younger women with breast cancer: the aLLIAnCE pilot study protocol. <i>Pilot and feasibility studies</i> 2017;3: 31. | Study protocol |
| Bradford A, Woodard TL. Novel Psychological Intervention for Decision Support in Women Considering Fertility Preservation Before Cancer Treatment. <i>Journal of adolescent and young adult oncology</i> 2017;6: 348-352. | PubType: Case report 3 cases) |
| Nicholas Z, Butow P, Tesson S, Boyle F. A systematic review of decision aids for patients making a decision about treatment for early breast cancer. <i>Breast (Edinburgh, Scotland)</i> 2016;26: 31-45. | Relevant outcomes are not assessed or inappropriately assessed |
| Gardino SL, Jeruss JS, Woodruff TK. Using decision trees to enhance interdisciplinary team work: the case of oncofertility. <i>Journal of assisted reproduction and genetics</i> 2010;27: 227-231. | Description of a decision tree |
| Giraudi S, Lambertini M, Anserini P, Poggio F, Iacono G, Abate A, Pastorino S, Levaggi A, D'Alonzo A, Vaglica M et al. Prospective study of fertility preservation strategies in young early breast cancer patients: the PREFER (PREgnancy and FERtility) trial <i>Annals of oncology</i> . 2015, pp. vi11. | Relevant outcomes are not assessed or inappropriately assessed |
| Nobel A, Christer J. Contributing factors to oncology practitioners' recommendations of fertility preservation for adolescent and young adult cancer patients <i>Psycho-oncology</i> . 2014, pp. 7-8. | It is the same study as Noobel Murray 2016 |
| Winterling J, Wiklander M, Lampic C, Micaux OC, Eriksson L, Wettergren L. Development of an internet intervention targeting reproductive and sexual health following cancer Bone marrow transplantation. 2016, pp. S130. | It is a description of the program. No results |
| Jukkala A. Breast cancer survivors and fertility preservation: ethical and religious considerations. <i>Seminars in oncology nursing</i> 2009;25: 278-283. | Relevant outcomes are not assessed or inappropriately assessed |
| Lambertini M, Anserini P, Fontana V, Poggio F, Iacono G, Abate A, Levaggi A, Miglietta L, Bighin C, Giraudi S et al. The PREGnancy and FERtility (PREFER) study: an Italian multicenter prospective cohort study on fertility preservation and pregnancy issues in young breast cancer patients. <i>BMC cancer</i> 2017;17: 346. | Study protocol |
| Nahata L, Tishelman AC, Caltabellotta NM, Quinn GP. Low Fertility Preservation Utilization Among Transgender Youth. <i>The Journal of adolescent health</i> 2017;61: 40-44. | Relevant outcomes are not assessed or inappropriately assessed |
| Inhorn MC, Birenbaum-Carmeli D, Westphal LM, Doyle J, Gleicher N, Meirou D, Raanani H, Dirnfeld M, Patrizio P. Medical egg freezing: the importance of a patient-centered approach to fertility preservation. <i>Journal of assisted reproduction and genetics</i> 2018;35: 49-59. | Relevant outcomes are not assessed or inappropriately assessed |
| Sawyer SM, McCarthy MC, Dunt D, McNeil R, Thompson K, Orme L, Drew SE. Fulfilling the Vision of Youth-Friendly Cancer Care: A Study Protocol. <i>Journal of adolescent and young adult oncology</i> 2016;5: 267-277. | Study protocol |

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| Lotz L, Maktabi A, Hoffmann I, Findeklee S, Beckmann MW, Dittrich R. Ovarian tissue cryopreservation and retransplantation--what do patients think about it? <i>Reproductive biomedicine online</i> 2016;32: 394-400. | Relevant outcomes are not assessed or inappropriately assessed |
| Banerjee R, Tsiapali E. Occurrence and recall rates of fertility discussions with young breast cancer patients. <i>Supportive care in cancer</i> 2016;24: 163-171. | Relevant outcomes are not assessed or inappropriately assessed |
| Buske D, Sender A, Richter D, Brahler E, Geue K. Patient-Physician Communication and Knowledge Regarding Fertility Issues from German Oncologists' Perspective-a Quantitative Survey. <i>Journal of cancer education</i> 2016;31: 115-122. | Relevant outcomes are not assessed or inappropriately assessed |
| Fertility preservation and consent. <i>The Lancet Oncology</i> 2014;15: 361. | It's an editorial. Consent of post-mortem use of gametes |
| Quinn GP, Vadaparampil ST. More research, more responsibility: the expansion of duty to warn in cancer patients considering fertility preservation. <i>American journal of obstetrics and gynecology</i> 2013;209: 98-102. | informative paper/ expert opinion ? |
| Duncan FE, Jozefik JK, Kim AM, Hirshfeld-Cytron J, Woodruff TK. The Gynecologist Has a Unique Role in Providing Oncofertility Care to Young Cancer Patients. <i>US obstetrics & gynaecology</i> 2011;6: 24-34. | informative paper/ expert opinion ? |
| Jukkala AM, Azuero A, McNeese P, Bates GW, Meneses K. Self-assessed knowledge of treatment and fertility preservation in young women with breast cancer. <i>Fertility and sterility</i> 2010;94: 2396-2398. | Relevant outcomes are not assessed or inappropriately assessed |
| Balthazar U, Fritz MA, Mersereau JE. Fertility preservation: a pilot study to assess previsit patient knowledge quantitatively. <i>Fertility and sterility</i> 2011;95: 1913-1916. | Relevant outcomes are not assessed or inappropriately assessed |
| Urech C, Ehrbar V, Boivin J, Muller M, Alder J, Zanetti Dallenbach R, Rochlitz C, Tschudin S. Knowledge about and attitude towards fertility preservation in young female cancer patients: a cross-sectional online survey. <i>Human fertility</i> 2018;21: 45-51. | Relevant outcomes are not assessed or inappropriately assessed |
| Johnson EK, Rosoklija I, Shurba A, D'Oro A, Gordon EJ, Chen D, Finlayson C, Holl JL. Future fertility for individuals with differences of sex development: Parent attitudes and perspectives about decision-making. <i>Journal of pediatric urology</i> 2017;13: 402-413. | Relevant outcomes are not assessed or inappropriately assessed |
| Villarreal-Garza C, Martinez-Cannon BA, Platas A, Mohar A, Partridge AH, Gil-Moran A, Fonseca A, Vega Y, Bargallo-Rocha E, Cardona-Huerta S et al. Fertility concerns among breast cancer patients in Mexico. <i>Breast</i> 2017;33: 71-75. | Relevant outcomes are not assessed or inappropriately assessed |
| Nobel Murray A, Chrisler JC, Robbins ML. Adolescents and Young Adults With Cancer: Oncology Nurses Report Attitudes and Barriers to Discussing Fertility Preservation. <i>Clinical journal of oncology nursing</i> 2016;20: E93-99. | Relevant outcomes are not assessed or inappropriately assessed |
| Angarita AM, Johnson CA, Fader AN, Christianson MS. Fertility Preservation: A Key Survivorship Issue for Young Women with Cancer. <i>Frontiers in oncology</i> 2016;6: 102. | Review/expert opinion |
| Taylor JF, Ott MA. Fertility Preservation after a Cancer Diagnosis: A Systematic Review of Adolescents', Parents', and Providers' Perspectives, Experiences, and Preferences. <i>Journal of pediatric and adolescent gynecology</i> 2016;29: 585-598. | Relevant outcomes are not assessed or inappropriately assessed |
| von Wolff M, Giesecke D, Germeyer A, Lawrenz B, Henes M, Nawroth F, Friebel S, Rohde A, Giesecke P, Denschlag D. Characteristics and attitudes of women in relation to chosen fertility preservation techniques: a prospective, multicenter questionnaire-based study with 144 participants. <i>European journal of obstetrics, gynecology, and reproductive biology</i> 2016;201: 12-17. | Relevant outcomes are not assessed or inappropriately assessed |
| A MR, Galvin KM, Harper MM, Clayman ML. A comparison of heterosexual and LGBTQ cancer survivors' outlooks on relationships, family building, possible infertility, and patient-doctor fertility risk communication. <i>Journal of cancer survivorship : research and practice</i> 2016;10: 935-942. | Relevant outcomes are not assessed or inappropriately assessed |
| Ter Keurst A, Boivin J, Gameiro S. Women's intentions to use fertility preservation to prevent age-related fertility decline. <i>Reproductive biomedicine online</i> 2016;32: 121-131. | Relevant outcomes are not assessed or inappropriately assessed |
| Schmidt R, Richter D, Sender A, Geue K. Motivations for having children after cancer--a systematic review of the literature. <i>European journal of cancer care</i> 2016;25: 6-17. | Relevant outcomes are not assessed or inappropriately assessed |
| Dryden A, Ussher JM, Perz J. Young women's construction of their post-cancer fertility. <i>Psychology & health</i> 2014;29: 1341-1360. | Relevant outcomes are not assessed or inappropriately assessed |
| Ruddy KJ, Gelber SI, Tamimi RM, Ginsburg ES, Schapira L, Come SE, Borges VF, Meyer ME, Partridge AH. Prospective study of fertility concerns and preservation strategies in young women with breast cancer. <i>Journal of clinical oncology</i> 2014;32: 1151-1156. | Relevant outcomes are not assessed or inappropriately assessed |
| Senkus E, Gomez H, Dirix L, Jerusalem G, Murray E, Van Tienhoven G, Westenberg AH, Bottomley A, Rapon J, Bogaerts J et al. Attitudes of young patients with breast cancer toward fertility loss related to adjuvant systemic therapies. <i>EORTC study 10002 BIG 3-98. Psycho-oncology</i> 2014;23: 173-182. | Relevant outcomes are not assessed or inappropriately assessed |
| Quinn GP, Knapp CA, Malo TL, McIntyre J, Jacobsen PB, Vadaparampil ST. Physicians' undecided attitudes toward posthumous reproduction: fertility preservation in cancer patients with a poor prognosis. <i>The journal of supportive oncology</i> 2012;10: 160-165. | Relevant outcomes are not assessed or inappropriately assessed |
| Wierckx K, Van Caenegem E, Pennings G, Elaut E, Dedecker D, Van de Peer F, Weyers S, De Sutter P, T'Sjoen G. Reproductive wish in transsexual men. <i>Human reproduction</i> 2012;27: 483-487. | Relevant outcomes are not assessed or inappropriately assessed |
| Azim HA, Jr., Peccatori FA, de Azambuja E, Piccart MJ. Motherhood after breast cancer: searching for la dolce vita. <i>Expert review of anticancer therapy</i> 2011;11: 287-298. | Relevant outcomes are not assessed or inappropriately assessed. expert opinion |
| Loi K, Lau M, Loh SF, Tan YY, Hong GS, Chan MY, Tan AM. Attitudes toward fertility preservation in female cancer patients. <i>The Journal of reproductive medicine</i> 2010;55: 411-416. | Relevant outcomes are not assessed or inappropriately assessed |

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| Gorman JR, Usita PM, Madlensky L, Pierce JP. Young breast cancer survivors: their perspectives on treatment decisions and fertility concerns. <i>Cancer nursing</i> 2011;34: 32-40. | Relevant outcomes are not assessed or inappropriately assessed. expert opinion |
| Schover LR. Patient attitudes toward fertility preservation. <i>Pediatric blood & cancer</i> 2009;53: 281-284. | Relevant outcomes are not assessed or inappropriately assessed: narrative review. |
| Komatsu H, Yagasaki K, Yamauchi H. Fertility decision-making under certainty and uncertainty in cancer patients. <i>Sexual & reproductive healthcare</i> 2018;15: 40-45. | Relevant outcomes are not assessed or inappropriately assessed |
| Dagan E, Modiano-Gattegno S, Birenbaum-Carmeli D. 'My choice': breast cancer patients recollect doctors fertility preservation recommendations. <i>Supportive care in cancer</i> 2017;25: 2421-2428. | Relevant outcomes are not assessed or inappropriately assessed |
| Flink DM, Kondapalli LA, Kellar-Guenther Y. Priorities in Fertility Decisions for Reproductive-Aged Cancer Patients: Fertility Attitudes and Cancer Treatment Study. <i>Journal of adolescent and young adult oncology</i> 2017;6: 435-443. | Relevant outcomes are not assessed or inappropriately assessed |
| Mitu K. Transgender Reproductive Choice and Fertility Preservation. <i>AMA journal of ethics</i> 2016;18: 1119-1125. | EXPERT OPINION |
| Chan JL, Johnson LNC, Sammel MD, DiGiovanni L, Voong C, Domchek SM, Gracia CR. Reproductive Decision-Making in Women with BRCA1/2 Mutations. <i>Journal of genetic counseling</i> 2017;26: 594-603. | Relevant outcomes are not assessed or inappropriately assessed |
| Hershberger PE, Sipsma H, Finnegan L, Hirshfeld-Cytron J. Reasons Why Young Women Accept or Decline Fertility Preservation After Cancer Diagnosis. <i>Journal of obstetric, gynecologic, and neonatal nursing</i> : JOGNN 2016;45: 123-134. | Relevant outcomes are not assessed or inappropriately assessed |
| Benedict C, Thom B, Kelvin JF. Young Adult Female Cancer Survivors' Decision Regret About Fertility Preservation. <i>Journal of adolescent and young adult oncology</i> 2015;4: 213-218. | Relevant outcomes are not assessed or inappropriately assessed |
| Mersereau JE, Goodman LR, Deal AM, Gorman JR, Whitcomb BW, Su HI. To preserve or not to preserve: how difficult is the decision about fertility preservation? <i>Cancer</i> 2013;119: 4044-4050. | Relevant outcomes are not assessed or inappropriately assessed |
| Chung K, Donnez J, Ginsburg E, Meirou D. Emergency IVF versus ovarian tissue cryopreservation: decision making in fertility preservation for female cancer patients. <i>Fertility and sterility</i> 2013;99: 1534-1542. | description of techniques |
| Snyder KA, Tate AL. What to do now? How women with breast cancer make fertility preservation decisions. <i>The journal of family planning and reproductive health care</i> 2013;39: 172-178. | Relevant outcomes are not assessed or inappropriately assessed |
| Hershberger PE, Finnegan L, Pierce PF, Scoccia B. The decision-making process of young adult women with cancer who considered fertility cryopreservation. <i>Journal of obstetric, gynecologic, and neonatal nursing</i> : JOGNN 2013;42: 59-69. | |
| Kim J, Oktay K, Gracia C, Lee S, Morse C, Mersereau JE. Which patients pursue fertility preservation treatments? A multicenter analysis of the predictors of fertility preservation in women with breast cancer. <i>Fertility and sterility</i> 2012;97: 671-676. | Relevant outcomes are not assessed or inappropriately assessed |
| Gardino SL, Emanuel LL. Choosing life when facing death: understanding fertility preservation decision-making for cancer patients. <i>Cancer treatment and research</i> 2010;156: 447-458. | Expert comment |
| Jona K, Gerber A. MyOncofertility.org: a web-based patient education resource supporting decision making under severe emotional and cognitive overload. <i>Cancer treatment and research</i> 2010;156: 345-361. | Description of tool |
| Simoni MK, Mu L, Collins SC. Women's career priority is associated with attitudes towards family planning and ethical acceptance of reproductive technologies. <i>Human reproduction (Oxford, England)</i> 2017;32: 2069-2075. | Relevant outcomes are not assessed or inappropriately assessed |
| Carvalho BR, Kliemchen J, Woodruff TK. Ethical, moral and other aspects related to fertility preservation in cancer patients. <i>JBRA assisted reproduction</i> 2017;21: 45-48. | Topic: ETHICS; PubType: EXPERT OPINION /ethical analysis) |
| Goodman A. Oncofertility for Adolescents: When Parents and Physicians Disagree about Egg Cryopreservation for a Mature Minor. <i>AMA journal of ethics</i> 2015;17: 826-833. | Topic: ETHICS; PubType: EXPERT OPINION |
| Murphy TF. The ethics of fertility preservation in transgender body modifications. <i>Journal of bioethical inquiry</i> 2012;9: 311-316. | Topic: ETHICS; PubType: EXPERT OPINION |
| Larcher V. The ethical obligation to preserve fertility in the face of all therapies that might adversely affect it. <i>Archives of disease in childhood</i> 2012;97: 767-768. | Topic: ETHICS; PubType: EXPERT OPINION |
| Kucuk M. Fertility preservation for women with malignant diseases: ethical aspects and risks. <i>Gynecological endocrinology</i> 2012;28: 937-940. | Topic: ETHICS; PubType: EXPERT OPINION |
| Patrizio P, Caplan AL. Ethical issues surrounding fertility preservation in cancer patients. <i>Clinical obstetrics and gynecology</i> 2010;53: 717-726. | Topic: ETHICS; PubType: EXPERT OPINION |
| Deepinder F, Agarwal A. Technical and ethical challenges of fertility preservation in young cancer patients. <i>Reproductive biomedicine online</i> 2008;16: 784-791. | Topic: ETHICS; PubType: EXPERT OPINION |
| Dudzinski DM. Ethical issues in fertility preservation for adolescent cancer survivors: oocyte and ovarian tissue cryopreservation. <i>Journal of pediatric and adolescent gynecology</i> 2004;17: 97-102. | Topic: ETHICS; PubType: EXPERT OPINION |
| Grundy R, Larcher V, Gosden RG, Hewitt M, Leiper A, Spoudeas HA, Walker D, Wallace WH. Fertility preservation for children treated for cancer (2): ethics of consent for gamete storage and experimentation. <i>Archives of disease in childhood</i> 2001;84: 360-362. | Topic: ETHICS; PubType: EXPERT OPINION |
| Hanselin MR, Roybal DL, Leininger TB. Ethics and Oncofertility: A Call for Religious Sensitivity. <i>Journal of oncology practice</i> 2017;13: e582-e589. | Topic: ETHICS; PubType: EXPERT OPINION |
| Benedict C, Thom B, Friedman DN, Pottenger E, Raghunathan N, Kelvin JF. Fertility information needs and concerns post-treatment contribute to lowered quality of life among young adult female cancer survivors. <i>Supportive care in cancer</i> 2018. | Excluded. No intervention. No relevant outcomes were assessed |
| Ussher JM, Parton C, Perz J. Need for information, honesty and respect: patient perspectives on health care professionals communication about cancer and fertility. <i>Reproductive health</i> 2018;15: 2. | Excluded. No intervention. No relevant outcomes were assessed |

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| Hershberger PE, Finnegan L, Altfeld S, Lake S, Hirshfeld-Cytron J. Toward theoretical understanding of the fertility preservation decision-making process: examining information processing among young women with cancer. <i>Research and theory for nursing practice</i> 2013;27: 257-275. | Excluded. No intervention. No relevant outcomes were assessed |
| Clayman ML, Harper MM, Quinn GP, Reinecke J, Shah S. Oncofertility resources at NCI-designated comprehensive cancer centers. <i>Journal of the National Comprehensive Cancer Network : JNCCN</i> 2013;11: 1504-1509. | Excluded. No intervention. No relevant outcomes were assessed |
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| Lewin J, Ma JMZ, Mitchell L, Tam S, Puri N, Stephens D, Srikanthan A, Bedard P, Razak A, Crump M et al. The positive effect of a dedicated adolescent and young adult fertility program on the rates of documentation of therapy-associated infertility risk and fertility preservation options. <i>Supportive care in cancer</i> 2017;25: 1915-1922. | Excluded: Assessed documentation. No intervention is assessed. Relevant outcomes were not assessed. |
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| Corney RH, Swinglehurst AJ. Young childless women with breast cancer in the UK: a qualitative study of their fertility-related experiences, options, and the information given by health professionals. <i>Psychooncology</i> 2014;23: 20-26. | psychological aspects, experience with FP |
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| Noyes N, Melzer K, Druckenmiller S, Fino ME, Smith M, Knopman JM. Experiences in fertility preservation: lessons learned to ensure that fertility and reproductive autonomy remain options for cancer survivors. <i>J Assist Reprod Genet</i> 2013;30: 1263-1270. | psychological aspects, experience with FP |
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| Rosen A, Rodriguez-Wallberg KA, Rosenzweig L. Psychosocial distress in young cancer survivors. <i>Semin Oncol Nurs</i> 2009;25: 268-277. | psychological aspects, experience with FP |
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| Parton, C., J.M. Ussher, and J. Perz. Hope, burden or risk: a discourse analytic study of the construction and experience of fertility preservation in the context of cancer. <i>Psychol Health</i> , 2019, 34(4): p. 456-477. | Paper does not answer the key question |
| Stiner, R.K., et al., Attitudes toward fertility and fertility preservation in women with glioma. <i>Neurooncol Pract</i> , 2019, 6(3): p. 218-225. | Paper does not answer the key question |
| Ameri, A., et al., Awareness of Female Cancer Patients About the Risk of Impaired Fertility. <i>J Adolesc Young Adult Oncol</i> , 2019, 8(3): p. 342-348. | Paper does not answer the key question |
| Korte, E., et al., Fertility-Related Wishes and Concerns of Adolescent Cancer Patients and Their Parents. <i>J Adolesc Young Adult Oncol</i> , 2019. | Paper does not answer the key question |
| Ruggeri, M., et al., Fertility concerns, preservation strategies and quality of life in young women with breast cancer: Baseline results from an ongoing prospective cohort study in selected European Centers. <i>Breast</i> , 2019, 47: p. 85-92. | Paper does not answer the key question |
| Young, K., et al., Fertility counseling before cancer treatment and subsequent reproductive concerns among female adolescent and young adult cancer survivors. <i>Cancer</i> , 2019, 125(6): p. 980-989. | Paper does not answer the key question |
| Logan, S. and A. Anazodo, The psychological importance of fertility preservation counseling and support for cancer patients. <i>Acta Obstet Gynecol Scand</i> , 2019, 98(5): p. 583-597. | Paper does not answer the key question |
| La Rosa, V.L., et al., Quality of life and fertility preservation counseling for women with gynecological cancer: an integrated psychological and clinical perspective. <i>J Psychosom Obstet Gynaecol</i> , 2019: p. 1-7. | Paper does not answer the key question |
| Lambertini, M., et al., Oncofertility counselling in premenopausal women with HER2-positive breast cancer. <i>Oncotarget</i> , 2019, 10(9): p. 926-929. | Paper does not answer the key question |
| Wang, Y., A. Anazodo, and S. Logan. Systematic review of fertility preservation patient decision aids for cancer patients. <i>Psychooncology</i> , 2019, 28(3): p. 459-467. | Paper does not answer the key question |
| Rodriguez-Wallberg, K.A., et al., National guidelines and multilingual age-adapted patient brochures and videos as decision aids for fertility preservation (FP) of children and teenagers with cancer-A multidisciplinary effort to improve children's information and access to FP in Sweden. <i>Acta Obstet Gynecol Scand</i> , 2019, 98(5): p. 679-680. | Paper does not answer the key question |
| Kim, R., et al., Decision making processes of women who seek elective oocyte cryopreservation. <i>J Assist Reprod Genet</i> , 2018, 35(9): p. 1623-1630. | Paper does not answer the key question |
| Melo, C., et al., Female cancer patients' perceptions of the fertility preservation decision-making process: An exploratory prospective study. <i>J Psychosoc Oncol</i> , 2018, 36(3): p. 364-381. | Paper does not answer the key question |
| Melo, C., et al., The time is now: An exploratory study regarding the predictors of female cancer patients' decision to undergo fertility preservation. <i>Eur J Cancer Care (Engl)</i> , 2019, 28(4): p. e13025. | Paper does not answer the key question |
| Peterson, B., et al., Initiating patient discussions about oocyte cryopreservation: Attitudes of obstetrics and gynaecology resident physicians. <i>Reprod Biomed Soc Online</i> , 2018, 6: p. 72-79. | Paper does not answer the key question |
| Wright, E., W. Norton, and M. Geary, Nurses' experiences of undertaking fertility-related discussions with teenagers and young adults with cancer: An interpretive phenomenological analysis. <i>J Adv Nurs</i> , 2018, 74(12): p. 2860-2870. | Paper does not answer the key question |
| Sisk, B.A., et al., Ethical issues in the care of adolescent and young adult oncology patients. <i>Pediatr Blood Cancer</i> , 2019, 66(5): p. e27608. | Paper does not answer the key question |

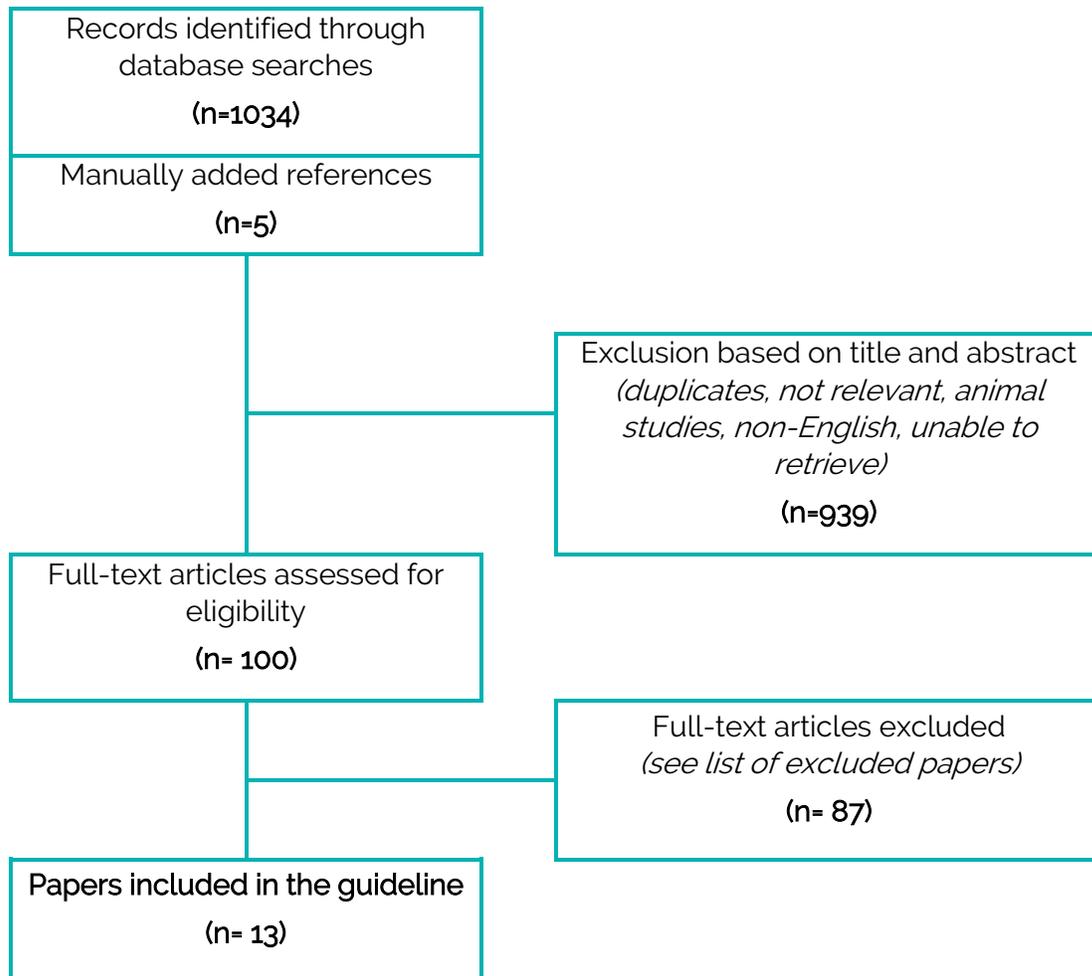
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| de Man, A.M., et al., Female fertility in the cancer setting: availability and quality of online health information. <i>Hum Fertil (Camb)</i> , 2018; p. 1-9. | Paper does not answer the key question |
| Gorman, J.R., et al., Applying behavioral theory to understand fertility consultation uptake after cancer. <i>Psychooncology</i> , 2019. 28(4): p. 822-829. | Paper does not answer the key question |
| Mahmoodi, N., et al., Are publicly available internet resources enabling women to make informed fertility preservation decisions before starting cancer treatment: an environmental scan? <i>BMC Med Inform Decis Mak</i> , 2018. 18(1): p. 104. | Paper does not answer the key question |
| Vesali, S., et al., Little information about fertility preservation is provided for cancer patients: A survey of oncologists' knowledge, attitude and current practice. <i>Eur J Cancer Care (Engl)</i> , 2019. 28(1): p. e12947. | Paper does not answer the key question |
| Panagiotopoulou, N., F.W. van Delft, and J.A. Stewart, Fertility preservation knowledge, attitudes and intentions among children by proxy and adolescents with cancer. <i>Reprod Biomed Online</i> , 2019. | Paper does not answer the key question |
| Wang, Y., et al., Female oncofertility attitude and knowledge: a survey of reproductive health professionals in Shanghai, China. <i>Future Oncol</i> , 2019. 15(4): p. 371-379. | Paper does not answer the key question |
| Chen, D., et al., Knowledge, Practice Behaviors, and Perceived Barriers to Fertility Care Among Providers of Transgender Healthcare. <i>J Adolesc Health</i> , 2019. 64(2): p. 226-234. | Paper does not answer the key question |
| Ciccarone, M., et al., Preliminary results of a counselling programme for fertility preservation in female cancer patients: The experience of the GEMME DORMIENTI network. <i>Eur J Cancer Care (Engl)</i> , 2019; p. e13174. | Paper does not answer the key question |
| Khalife, D., et al., Parental Attitudes Toward Fertility Preservation in Female Adolescent Cancer Patients in Lebanon. <i>J Pediatr Adolesc Gynecol</i> , 2019. | Paper does not answer the key question |
| Takeuchi, E., et al., A Content Analysis of Multidimensional Support Needs Regarding Fertility Among Cancer Patients: How Can Nonphysician Health Care Providers Support? <i>J Adolesc Young Adult Oncol</i> , 2019. 8(2): p. 205-211. | Paper does not answer the key question |
| Cheng, P.J., et al., Fertility concerns of the transgender patient. <i>Transl Androl Urol</i> , 2019. 8(3): p. 209-218. | Paper does not answer the key question |
| Riggs, D.W. and C. Bartholomaeus, Fertility preservation decision making amongst Australian transgender and non-binary adults. <i>Reprod Health</i> , 2018. 15(1): p. 181. | Paper does not answer the key question |
| Bartholomaeus, C. and D.W. Riggs, Transgender and non-binary Australians' experiences with healthcare professionals in relation to fertility preservation. <i>Cult Health Sex</i> , 2019; p. 1-17. | Paper does not answer the key question |
| Baram, S., et al., Fertility preservation for transgender adolescents and young adults: a systematic review. <i>Hum Reprod Update</i> , 2019. | Paper does not answer the key question |
| Mintziori, G., et al., Egg freezing and late motherhood. <i>Maturitas</i> , 2019. 125: p. 1-4. | Paper does not answer the key question |
| Villarreal-Garza, C., et al., Fertility concerns among breast cancer patients in Mexico. <i>Breast (edinburgh, scotland)</i> , 2017. 33: p. 71-75. | Paper does not answer the key question |
| Dundar Akin, O., et al., Awareness of fertility and reproductive aging in women seeking oocyte cryopreservation, reproductive aged controls, and female health care professionals: A comparative study. <i>Eur J Obstet Gynecol Reprod Biol</i> , 2019. 233: p. 146-150. | Paper does not answer the key question |
| Stevenson, E.L., et al., Knowledge and decision making about future fertility and oocyte cryopreservation among young women. <i>Hum Fertil (Camb)</i> , 2019; p. 1-10. | Paper does not answer the key question |

Q 4 Is there a benefit of psychological support and counseling, and are there particular groups that would benefit?

Search strings

| DATABASE | Search string |
|----------------|---|
| PUBMED | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation" OR fertility) AND ("psychological support" OR "psychosocial support" OR "Counseling"[Mesh] OR "Counseling" OR "Counselling" OR "Psychosocial Support Systems"[Mesh] OR "Psychotherapy"[Mesh] OR "Psychotherapy" OR "oncofertility support") |
| PUBMED | ("Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassaemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis") AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation" OR fertility) AND ("psychological support" OR "psychosocial support" OR "Counseling"[Mesh] OR "Counseling" OR "Counselling" OR "Psychosocial Support Systems"[Mesh] OR "Psychotherapy"[Mesh] OR "Psychotherapy") |
| PUBMED | ("Transgender Persons"[Mesh] OR Transgender OR Transsexual) AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation" OR fertility) AND ("psychological support" OR "psychosocial support" OR "Counseling"[Mesh] OR "Counseling" OR "Counselling" OR "Psychosocial Support Systems"[Mesh] OR "Psychotherapy"[Mesh] OR "Psychotherapy") |
| PUBMED | ("anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing") AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation" OR fertility) AND ("psychological support" OR "psychosocial support" OR "Counseling"[Mesh] OR "Counseling" OR "Counselling" OR "Psychosocial Support Systems"[Mesh] OR "Psychotherapy"[Mesh] OR "Psychotherapy") |
| PUBMED | ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("psychological support" OR "psychosocial support" OR "Counseling"[Mesh] OR "Counseling" OR "Counselling" OR "Psychosocial Support Systems"[Mesh] OR "Psychotherapy"[Mesh] OR "Psychotherapy" OR "oncofertility support") NOT SEARCH 1-4 |
| COCHRANE MERGE | ((Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR Systemic lupus erythematosus OR Behcet's disease OR Behcet Syndrome OR Churg-Strauss syndrome OR eosinophilic granulomatosis OR Steroid resistant glomerulonephritis OR glomerulonephritis OR Granulomatosis with polyangiitis OR Wegener's granulomatosis OR Inflammatory bowel diseases OR Crohn Disease OR ulcerative colitis OR Rheumatoid arthritis OR Pemphigus vulgaris OR Pemphigus OR Autoimmune Diseases OR Haematological diseases OR Anemia OR sickle cell anaemia OR thalassaemia major OR plastic anaemia OR Altered hypothalamic-pituitary-gonadal axis OR Ovarian oophoritis OR Oophoritis OR Benign ovarian tumours OR Mosaic Turner's syndrome OR Turner Syndrome OR Fragile X Mental Retardation 1 OR Fragile X Syndrome OR Galactosaemia OR Galactosemias OR Beta-thalassaemia OR Endometriosis OR Transgender Persons OR Transgender OR Transsexual OR anticipated gamete exhaustion OR age-related fertility decline OR social freezing OR nonmedical freezing OR social egg-freezing OR Elective freezing) AND (Fertility Preservation OR fertility) AND (psychological support OR psychosocial support OR Counseling OR Counselling OR Psychosocial Support Systems OR Psychotherapy OR oncofertility support) OR ((Fertility Preservation) AND (psychological support OR psychosocial support OR Counseling OR Counselling OR Psychosocial Support Systems OR Psychotherapy)) |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|---|---|
| Logan S, Perz J, Ussher J, Peate M, Anazodo A. Clinician provision of oncofertility support in cancer patients of a reproductive age: A systematic review. <i>Psychooncology</i> 2018;27: 748-756. | No relevant intervention |
| Runco DV, Taylor JF, Helft PR. Ethical Barriers in Adolescent Oncofertility Counseling. <i>J Pediatr Hematol Oncol</i> 2017;39: 56-61. | Topic: Ethics |
| Bracewell-Milnes T, Saso S, Bora S, Ismail AM, Al-Memar M, Hamed AH, Abdalla H, Thum MY. Investigating psychosocial attitudes, motivations and experiences of oocyte donors, recipients and egg sharers: a systematic review. <i>Hum Reprod Update</i> 2016;22: 450-465. | Topic: donation |
| Barley D, Wangmo T, Elger BS, Ravitsky V. Attitudes, Beliefs, and Trends Regarding Adolescent Oncofertility Discussions: A Systematic Literature Review. <i>J Adolesc Young Adult Oncol</i> 2016;5: 119-134. | No relevant intervention |
| Deshpande NA, Braun IM, Meyer FL. Impact of fertility preservation counseling and treatment on psychological outcomes among women with cancer: A systematic review. <i>Cancer</i> 2015;121: 3938-3947. | Included in the systematic review by Logan 2019 |
| Lawson AK, Klock SC, Pavone ME, Hirshfeld-Cytron J, Smith KN, Kazer RR. Psychological Counseling of Female Fertility Preservation Patients. <i>J Psychosoc Oncol</i> 2015;33: 333-353. | Retrospective study of registry review. Prevalence of psychological problems. No intervention |
| Nass SJ, Beaupin LK, Demark-Wahnefried W, Fasciano K, Ganz PA, Hayes-Lattin B, Hudson MM, Nevidjon B, Oeffinger KC, Rechis R et al. Identifying and addressing the needs of adolescents and young adults with cancer: summary of an Institute of Medicine workshop. <i>Oncologist</i> 2015;20: 186-195. | No relevant intervention |
| Barbour RS, Porter MA, Peddie VL, Bhattacharya S. Counselling in the context of fertility and cancer: some sociological insights. <i>Hum Fertil (Camb)</i> 2013;16: 54-58. | Relevant intervention is not included |
| Tschudin S, Bitzer J. Psychological aspects of fertility preservation in men and women affected by cancer and other life-threatening diseases. <i>Hum Reprod Update</i> 2009;15: 587-597. | No specific information in psychological counselling or needs wzs provided |
| Surbone A. Counseling young cancer patients about reproductive issues. <i>Recent Results Cancer Res</i> 2008;178: 237-245. | Review not systematic; Relevant intervention is not included |
| Davis M. Fertility considerations for female adolescent and young adult patients following cancer therapy: A guide for counseling patients and their families. <i>Clin J Oncol Nurs</i> 2006;10: 213-219. | Relevant intervention is not included |
| Schover LR, Jenkins R, Sui D, Adams JH, Marion MS, Jackson KE. Randomized trial of peer counseling on reproductive health in African American breast cancer survivors. <i>J Clin Oncol</i> 2006;24: 1620-1626. | Relevant intervention is not included |
| Roberts CS, Piper L, Denny J, Cuddeback G. A support group intervention to facilitate young adults' adjustment to cancer. <i>Health Soc Work</i> 1997;22: 133-141. | Sample: Not FP patients |
| Takahashi Y, Shien T, Sakamoto A, Tsuyumu Y, Yoshioka R, Uno M, Hatono M, Kochi M, Kawada K, Tsukioki T et al. Current Multidisciplinary Approach to Fertility Preservation for Breast Cancer Patients. <i>Acta Med Okayama</i> 2018;72: 137-142. | Relevant intervention is not included |
| Lewin J, Ma JMZ, Mitchell L, Tam S, Puri N, Stephens D, Srikanthan A, Bedard P, Razak A, Crump M et al. The positive effect of a dedicated adolescent and young adult fertility program on the rates of documentation of therapy-associated infertility risk and fertility preservation options. <i>Support Care Cancer</i> 2017;25: 1915-1922. | Relevant intervention is not included |
| Peavey M, Arian S, Gibbons W, Lu K, Gershenson D, Woodard T. On-Site Fertility Preservation Services for Adolescents and Young Adults in a Comprehensive Cancer Center. <i>J Adolesc Young Adult Oncol</i> 2017;6: 229-234. | Relevant intervention is not included |
| Chin HB, Howards PP, Kramer MR, Mertens AC, Spencer JB. Which female cancer patients fail to receive fertility counseling before treatment in the state of Georgia? <i>Fertil Steril</i> 2016;106: 1763-1771.e1761. | Relevant intervention is not included |
| Bastings L, Baysal O, Beerendonk CC, Braat DD, Nelen WL. Referral for fertility preservation counselling in female cancer patients. <i>Hum Reprod</i> 2014;29: 2228-2237. | Relevant intervention is not included |
| Bastings L, Baysal O, Beerendonk CC, Int'Hout J, Traas MA, Verhaak CM, Braat DD, Nelen WL. Deciding about fertility preservation after specialist counselling. <i>Hum Reprod</i> 2014;29: 1721-1729. | Counselling by 7 gynecologists and nurse |
| Nurudeen SK, Douglas NC, Mahany EL, Sauer MV, Choi JM. Fertility Preservation Decisions Among Newly Diagnosed Oncology Patients: A Single-Center Experience. <i>Am J Clin Oncol</i> 2016;39: 154-159. | Relevant intervention is not included |
| Mersereau JE, Goodman LR, Deal AM, Gorman JR, Whitcomb BW, Su HI. To preserve or not to preserve: how difficult is the decision about fertility preservation? <i>Cancer</i> 2013;119: 4044-4050. | Relevant intervention is not included |
| Lind T, Lampic C, Hammarstrom M, Rodriguez-Wallberg K. Young women's perceptions of fertility-related information and fertility distress before surgery for ovarian cysts. <i>Acta Obstet Gynecol Scand</i> 2013;92: 1290-1296. | Relevant intervention is not included |
| Garvelink MM, ter Kuile MM, Bakker RM, Geense WJ, Jenninga E, Louwe LA, Hilders CG, Stiggelbout AM. Women's experiences with information provision and deciding about fertility preservation in the Netherlands: 'satisfaction in general, but unmet needs'. <i>Health Expect</i> 2015;18: 956-968. | Relevant intervention is not included |
| Niemasik EE, Letourneau J, Dohan D, Katz A, Melisko M, Rugo H, Rosen M. Patient perceptions of reproductive health counseling at the time of cancer diagnosis: a qualitative study of female California cancer survivors. <i>J Cancer Surviv</i> 2012;6: 324-332. | Relevant intervention is not included |
| Campfield Bonadies D, Moyer A, Matloff ET. What I wish I'd known before surgery: BRCA carriers' perspectives after bilateral salpingo-oophorectomy. <i>Fam Cancer</i> 2011;10: 79-85. | Relevant intervention is not included |
| Strong M, Peche W, Scaife C. Incidence of fertility counseling of women of child-bearing age before treatment for colorectal cancer. <i>Am J Surg</i> 2007;194: 765-767; discussion 767-768. | Relevant intervention is not included |

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| Smith KR, Ellington L, Chan AY, Croyle RT, Botkin JR. Fertility intentions following testing for a BRCA1 gene mutation. <i>Cancer Epidemiol Biomarkers Prev</i> 2004;13: 733-740. | Relevant intervention is not included |
| Saraf AJ, Stanek J, Audino A, Dajusta D, Hansen-Moore J, McCracken K, Whiteside S, Yeager N, Nahata L. Examining predictors and outcomes of fertility consults among children, adolescents, and young adults with cancer. <i>Pediatr Blood Cancer</i> 2018: e27409. | Relevant intervention is not included |
| Kim R, Yoon TK, Kang IS, Koong MK, Kim YS, Kim MJ, Lee Y, Kim J. Decision making processes of women who seek elective oocyte cryopreservation. <i>J Assist Reprod Genet</i> 2018. | Relevant intervention is not included |
| Skaczkowski G, White V, Thompson K, Bibby H, Coory M, Orme LM, Conyers R, Phillips MB, Osborn M, Harrup R et al. Factors influencing the provision of fertility counseling and impact on quality of life in adolescents and young adults with cancer. <i>J Psychosoc Oncol</i> 2018: 1-19. | Relevant intervention is not included |
| Mattsson E, Einhorn K, Ljungman L, Sundstrom-Poromaa I, Stalberg K, Wikman A. Women treated for gynaecological cancer during young adulthood - A mixed-methods study of perceived psychological distress and experiences of support from health care following end-of-treatment. <i>Gynecol Oncol</i> 2018;149: 464-469. | Relevant intervention is not included |
| Woodard TL, Hoffman AS, Crocker LC, Holman DA, Hoffman DB, Ma J, Bassett RL, Jr., Leal VB, Volk RJ. Pathways: patient-centred decision counselling for women at risk of cancer-related infertility: a protocol for a comparative effectiveness cluster randomised trial. <i>BMJ Open</i> 2018;8: e019994. | Presentation of a protocol. |
| Dolmans MM. Recent advances in fertility preservation and counseling for female cancer patients. <i>Expert Rev Anticancer Ther</i> 2018;18: 115-120. | Pub type : Report/expert |
| Paluch-Shimon S, Peccatori FA. BRCA 1 and 2 mutation status: the elephant in the room during oncofertility counseling for young breast cancer patients. <i>Ann Oncol</i> 2018;29: 26-28. | Relevant intervention is not included |
| Zarnegar S, Gosiengfiao Y, Rademaker A, Casey R, Albritton KH. Recall of Fertility Discussion by Adolescent Female Cancer Patients: A Survey-Based Pilot Study. <i>J Adolesc Young Adult Oncol</i> 2018;7: 249-253. | Relevant intervention is not included |
| Vitale SG, La Rosa VL, Rapisarda AMC, Lagana AS. The Importance of Fertility Preservation Counseling in Patients with Gynecologic Cancer. <i>J Reprod Infertil</i> 2017;18: 261-263. | PubType: commentary |
| Keim-Malpass J, Fitzhugh HS, Smith LP, Smith RP, Erickson J, Douvas MG, Thomas T, Petroni G, Duska L. What is the Role of the Oncology Nurse in Fertility Preservation Counseling and Education for Young Patients? <i>J Cancer Educ</i> 2017. | Relevant intervention is not included |
| Lawson AK, McGuire JM, Noncent E, Olivieri JF, Jr., Smith KN, Marsh EE. Disparities in Counseling Female Cancer Patients for Fertility Preservation. <i>J Womens Health (Larchmt)</i> 2017;26: 886-891. | Relevant intervention is not included |
| Dagan E, Modiano-Gattegno S, Birenbaum-Carmeli D. "My choice": breast cancer patients recollect doctors fertility preservation recommendations. <i>Support Care Cancer</i> 2017;25: 2421-2428. | Relevant intervention is not included |
| Krouwel EM, Nicolai MPJ, van Steijn-van Tol A, Putter H, Osanto S, Pelger RCM, Elzevier HW. Fertility preservation counselling in Dutch Oncology Practice: Are nurses ready to assist physicians? <i>Eur J Cancer Care (Engl)</i> 2017;26. | Relevant intervention is not included |
| Takeuchi E, Kato M, Wada S, Yoshida S, Shimizu C, Miyoshi Y. Physicians' practice of discussing fertility preservation with cancer patients and the associated attitudes and barriers. <i>Support Care Cancer</i> 2017;25: 1079-1085. | Relevant intervention is not included |
| Mahajan N, Patil M, Kaur S, Kaur S, Naidu P. The role of Indian gynecologists in oncofertility care and counselling. <i>J Hum Reprod Sci</i> 2016;9: 179-186. | Relevant intervention is not included |
| Chan JL, Johnson LNC, Sammel MD, DiGiovanni L, Voong C, Domchek SM, Gracia CR. Reproductive Decision-Making in Women with BRCA1/2 Mutations. <i>J Genet Couns</i> 2017;26: 594-603. | Relevant intervention is not included |
| Louwe LA, Stiggelbout AM, Overbeek A, Hilders C, van den Berg MH, Wendel E, van Dulmen-den Broeder E, Ter Kuile MM. Factors associated with frequency of discussion of or referral for counselling about fertility issues in female cancer patients. <i>Eur J Cancer Care (Engl)</i> 2018;27. | Relevant intervention is not included |
| Chan JL, Letourneau J, Salem W, Cil AP, Chan SW, Chen LM, Rosen MP. Regret around fertility choices is decreased with pre-treatment counseling in gynecologic cancer patients. <i>J Cancer Surviv</i> 2017;11: 58-63. | Relevant intervention is not included |
| Goetsch AL, Wicklund C, Clayman ML, Woodruff TK. Reproductive Endocrinologists' Utilization of Genetic Counselors for Oncofertility and Preimplantation Genetic Diagnosis (PGD) Treatment of BRCA1/2 Mutation Carriers. <i>J Genet Couns</i> 2016;25: 561-571. | Relevant intervention is not included |
| Goodman A. Oncofertility for Adolescents: When Parents and Physicians Disagree about Egg Cryopreservation for a Mature Minor. <i>AMA J Ethics</i> 2015;17: 826-833. | Topic Ethics |
| von Wolff M, Dittich R, Liebenhron J, Nawroth F, Schuring AN, Bruckner T, Germeyer A. Fertility-preservation counselling and treatment for medical reasons: data from a multinational network of over 5000 women. <i>Reprod Biomed Online</i> 2015;31: 605-612. | Relevant intervention is not included |
| Shnorhavorian M, Harlan LC, Smith AW, Keegan TH, Lynch CF, Prasad PK, Cress RD, Wu XC, Hamilton AS, Parsons HM et al. Fertility preservation knowledge, counseling, and actions among adolescent and young adult patients with cancer: A population-based study. <i>Cancer</i> 2015;121: 3499-3506. | Relevant intervention is not included |
| Banerjee R, Tsiapali E. Occurrence and recall rates of fertility discussions with young breast cancer patients. <i>Support Care Cancer</i> 2016;24: 163-171. | Relevant intervention is not included |
| Goncalves V, Tarrier N, Quinn G. Thinking about white bears: fertility issues in young breast cancer survivors. <i>Patient Educ Couns</i> 2015;98: 125-126. | PubType: commentary |
| Razzano A, Revelli A, Delle Piane L, Salvagno F, Casano S, Randaccio S, Benedetto C. Fertility preservation program before ovariotoxic oncologic treatments: role of the psychological support in managing emotional aspects. <i>Gynecol Endocrinol</i> 2014;30: 822-824. | Included in the systematic review by Logan 2019 |
| Corney RH, Swinglehurst AJ. Young childless women with breast cancer in the UK: a qualitative study of their fertility-related experiences, options, and the information given by health professionals. <i>Psychooncology</i> 2014;23: 20-26. | Relevant intervention is not included |
| Lambertini M, Anserini P, Levaggi A, Poggio F, Del Mastro L. Fertility counseling of young breast cancer patients. <i>J Thorac Dis</i> 2013;5 Suppl 1: S68-80. | Relevant intervention is not included |
| Woodson AH, Profato JL, Muse KI, Litton JK. Breast cancer in the young: role of the geneticist. <i>J Thorac Dis</i> 2013;5 Suppl 1: S19-26. | Relevant intervention is not included |

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| Nawroth F. Fertility preservation consultation for women with cancer: are we helping patients make high quality decisions? <i>Reprod Biomed Online</i> 2013;27: 29-30. | Pubb type: comment |
| Hershberger PE, Finnegan L, Pierce PF, Scoccia B. The decision-making process of young adult women with cancer who considered fertility cryopreservation. <i>J Obstet Gynecol Neonatal Nurs</i> 2013;42: 59-69. | Relevant intervention is not included |
| Ferrari A, Clerici CA, Casanova M, Luksch R, Terenziani M, Spreafico F, Polastri D, Meazza C, Veneroni L, Catania S et al. The Youth Project at the Istituto Nazionale Tumori in Milan. <i>Tumori</i> 2012;98: 399-407. | PubType: description of a project |
| Scanlon M, Blaes A, Geller M, Majhail NS, Lindgren B, Haddad T. Patient Satisfaction with Physician Discussions of Treatment Impact on Fertility, Menopause and Sexual Health among Pre-menopausal Women with Cancer. <i>J Cancer</i> 2012;3: 217-225. | Relevant intervention is not included |
| D'Agostino NM, Penney A, Zebrack B. Providing developmentally appropriate psychosocial care to adolescent and young adult cancer survivors. <i>Cancer</i> 2011;117: 2329-2334. | Relevant intervention is not included |
| Coleman SL, Grothey A. Should oncologists routinely discuss fertility preservation with cancer patients of childbearing age? <i>Mayo Clin Proc</i> 2011;86: 6-7. | PubType: editorial |
| Duffy CM, Allen SM, Clark MA. Discussions regarding reproductive health for young women with breast cancer undergoing chemotherapy. <i>J Clin Oncol</i> 2005;23: 766-773. | No psychological intervention, no information on psychological outcomes or needs |
| Dwosh E, Guimond C, Sadovnick AD. Reproductive counselling for MS: a rationale. <i>Int MS J</i> 2003;10: 52-59. | Relevant outcomes are not assessed or inappropriately assessed |
| Meissner K, Schweizer-Arau A, Limmer A, Preibisch C, Popovici RM, Lange I, de Oriol B, Beissner F. Psychotherapy With Somatosensory Stimulation for Endometriosis-Associated Pain: A Randomized Controlled Trial. <i>Obstet Gynecol</i> 2016;128: 1134-1142. | Relevant patients are not included, or only as subgroup |
| Nahata L, Sivaraman V, Quinn GP. Fertility counseling and preservation practices in youth with lupus and vasculitis undergoing gonadotoxic therapy. <i>Fertil Steril</i> 2016;106: 1470-1474. | Relevant outcomes are not assessed or inappropriately assessed |
| Shilalukey K, Kaufman M, Bradley S, Francombe WH, Amankwah K, Goldberg E, Shear N, Olivieri NF, Koren G. Counseling sexually active teenagers treated with potential human teratogens. <i>J Adolesc Health</i> 1997;21: 143-146. | Relevant outcomes are not assessed or inappropriately assessed |
| Nahata L, Tishelman AC, Caitabellotta NM, Quinn GP. Low Fertility Preservation Utilization Among Transgender Youth. <i>J Adolesc Health</i> 2017;61: 40-44. | Relevant outcomes are not assessed or inappropriately assessed |
| Nahata L, Campo-Engelstein LT, Tishelman A, Quinn GP, Lantos JD. Fertility Preservation for a Transgender Teenager. <i>Pediatrics</i> 2018;142. | Type: Case study |
| Chen D, Simons L. Ethical Considerations in Fertility Preservation for Transgender Youth: A Case Illustration. <i>Clin Pract Pediatr Psychol</i> 2018;6: 93-100. | Case study/Ethics |
| Hudson J, Nahata L, Dietz E, Quinn GP. Fertility Counseling for Transgender AYAs. <i>Clin Pract Pediatr Psychol</i> 2018;6: 84-92. | Relevant intervention is not included, PUB TYPE: Expert opinion, Case; |
| Kudesia R, Talib HJ, Pollack SE. Fertility Awareness Counseling for Adolescent Girls; Guiding Conception: The Right Time, Right Weight, and Right Way. <i>J Pediatr Adolesc Gynecol</i> 2017;30: 9-17. | Relevant intervention is not included |
| Birch Petersen K, Hvidman HW, Sylvest R, Pinborg A, Larsen EC, Macklon KT, Andersen AN, Schmidt L. Family intentions and personal considerations on postponing childbearing in childless cohabiting and single women aged 35-43 seeking fertility assessment and counselling. <i>Hum Reprod</i> 2015;30: 2563-2574. | Relevant intervention is not included |
| Garcia D, Vassena R, Prat A, Vernaev V. Poor knowledge of age-related fertility decline and assisted reproduction among healthcare professionals. <i>Reprod Biomed Online</i> 2017;34: 32-37. | Relevant intervention is not included |
| Fritz R, Klugman S, Lieman H, Schulkin J, Taouk L, Castleberry N, Buyuk E. Counseling patients on reproductive aging and elective fertility preservation-a survey of obstetricians and gynecologists' experience, approach, and knowledge. <i>J Assist Reprod Genet</i> 2018. | Relevant intervention is not included |
| Bachmann G, MacArthur TA, Khanuja K. Need for Comprehensive Counseling in Women Requesting Oocyte Cryopreservation. <i>J Womens Health (Larchmt)</i> 2018;27: 227-230. | Relevant intervention is not included |
| Massarotti, C., et al., Beyond fertility preservation: role of the oncofertility unit in the reproductive and gynecological follow-up of young cancer patients. <i>Hum Reprod</i> , 2019. 34(8): p. 1462-1469. | not psychosocial support/counselling |
| Madrigal, J.M., et al., Looking Through the Lens of a Family Planner to Prioritize Reproductive Health Among Women With Cancer. <i>J Oncol Pract</i> , 2019. 15(2): p. e141-e152. | not psychosocial support/counselling |
| Macklon, K.T. and B. Cjm Fauser, The female post-cancer fertility-counselling clinic: looking beyond the freezer. A much needed addition to oncofertility care. <i>Reprod Biomed Online</i> , 2019. 39(2): p. 179-181. | post cancer counselling |
| Lambertini, M. and I. Demeestere, Another step towards improving oncofertility counselling of young women with Hodgkin's lymphoma. <i>Lancet Oncol</i> , 2018. 19(10): p. 1264-1266. | Paper does not answer the key question |
| Lambertini, M., et al., Oncofertility counselling in premenopausal women with HER2-positive breast cancer. <i>Oncotarget</i> , 2019. 10(9): p. 926-929. | Paper does not answer the key question |
| Shah, J.S., et al., Reproductive counseling and pregnancy outcomes after radical trachelectomy for early stage cervical cancer. <i>J Gynecol Oncol</i> , 2019. 30(3): p. e45. | Paper does not answer the key question |
| Shandley, L.M. and L.J. McKenzie, Recent Advances in Fertility Preservation and Counseling for Reproductive-Aged Women with Colorectal Cancer: A Systematic Review. <i>Dis Colon Rectum</i> , 2019. 62(6): p. 762-771. | Paper does not answer the key question |
| Young, K., et al., Fertility counseling before cancer treatment and subsequent reproductive concerns among female adolescent and young adult cancer survivors. <i>Cancer</i> , 2019. 125(6): p. 980-989. | Paper does not answer the key question |
| Ciccarone, M., et al., Preliminary results of a counselling programme for fertility preservation in female cancer patients: The experience of the GEMME DORMIENTI network. <i>Eur J Cancer Care (Engl)</i> , 2019. p. e13174. | Paper does not answer the key question |

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| Zwingerman, R., et al., Expanding Urgent Oncofertility Services for Reproductive Age Women Remote from a Tertiary Level Fertility Centre by Use of Telemedicine and an On-site Nurse Navigator. <i>J Cancer Educ</i> , 2019. | Paper does not answer the key question |
| Garcia, D., R. Vassena, and A. Rodríguez, Single women and motherhood: right now or maybe later? <i>J Psychosom Obstet Gynaecol</i> , 2019: p. 1-5. | Decision making |
| Morgan, T.L., et al., Fertility counseling and preservation discussions for females with Turner syndrome in pediatric centers: practice patterns and predictors. <i>Fertil Steril</i> , 2019. 112(4): p. 740-748. | Specific patient group. |

Q 5. Which criteria can be used to select (screen?) patients for fertility preservation?

This question was answered as a narrative question. There was no literature search performed.

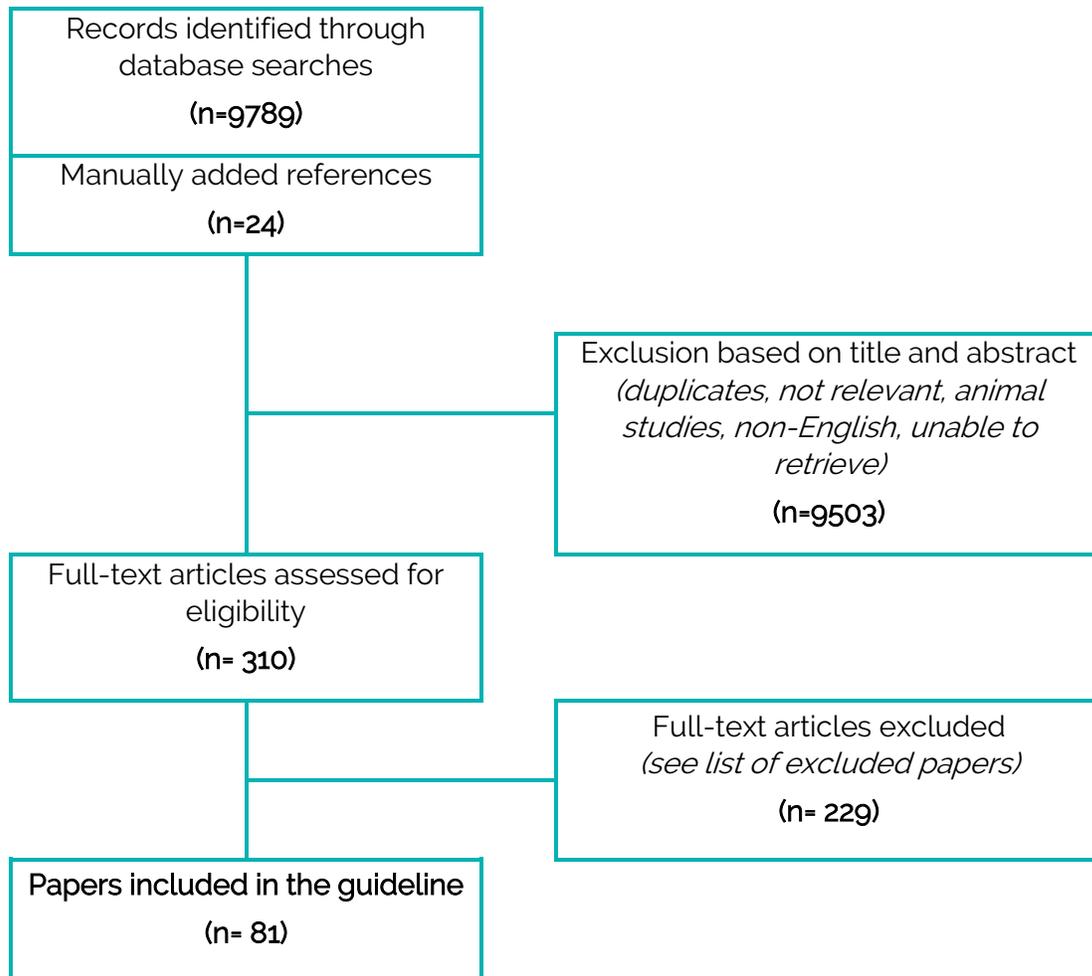
The information used to answer this question was derived from the papers selected for other questions in this guideline. In addition, the text was based on the expert opinion of the GDG members.

Q7. Which factors should be taken into account when estimating the individual risk of gonadotoxicity of a certain treatment?

Search strings

| DATABASE | Search string |
|---------------------|--|
| PUBMED – merge 1 | (“Neoplasms”[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR “Systemic lupus erythematosus” OR “Lupus Erythematosus, Systemic”[Mesh] OR “Behcet’s disease” OR “Behcet Syndrome”[Mesh] OR “Churg-Strauss syndrome” OR “Churg-Strauss Syndrome”[Mesh] OR “eosinophilic granulomatosis” OR “Steroid resistant glomerulonephritis” OR “glomerulonephritis” OR “Glomerulonephritis”[Mesh] OR “Granulomatosis with polyangiitis” OR “Wegener’s granulomatosis” OR “Granulomatosis with Polyangiitis”[Mesh] OR “Inflammatory bowel diseases” OR “Crohn Disease” OR “ulcerative colitis” OR “Inflammatory Bowel Diseases”[Mesh] OR “Arthritis, Rheumatoid”[Mesh] OR “Rheumatoid arthritis” OR “Pemphigus vulgaris” OR “Pemphigus”[Mesh] OR “Autoimmune Diseases”[Mesh] OR “Haematological diseases” OR “Hematologic Diseases”[Mesh] OR “Anemia”[Mesh] OR “sickle cell anaemia” OR “thalassaemia major” OR “plastic anaemia” OR “Altered hypothalamic–pituitary–gonadal axis” OR “Ovarian oophoritis” OR “Oophoritis”[Mesh] OR “Benign ovarian tumours” OR “Mosaic Turner’s syndrome” OR “Turner Syndrome”[Mesh] OR “Fragile X Mental Retardation 1” OR “Fragile X Syndrome”[Mesh] OR Galactosaemia OR “Galactosemias”[Mesh] OR “Beta-thalassaemia” OR “beta-Thalassemia”[Mesh] OR “Endometriosis”[Mesh] OR “Endometriosis”) AND (age OR BMI OR “body mass index”[MESH] OR weight OR duration OR cycles) AND (“Antineoplastic Agents”[Mesh] OR chemotherapy OR anthracycline OR “Immunosuppression”[Mesh] OR “Alkylating Agents”[Mesh] OR “Cyclophosphamide”[Mesh] OR “Hematopoietic Stem Cell Transplantation”[Mesh] OR “immunosuppressive therapy” OR “Alkylating Agents” OR “Cyclophosphamide” OR “Hematopoietic Stem Cell Transplantation” OR “Stem Cell Transplantation” OR “Immunosuppression”) AND (“Infertility”[Mesh] OR infertility OR infertile OR “resumption of menses” OR “resumption of menstruation” OR “Primary Ovarian Insufficiency”[Mesh] OR “Premature Ovarian Insufficiency” OR “Primary Ovarian Insufficiency” OR “Premature Ovarian Failure” OR “menopause” OR “Ovarian Reserve”[Mesh] OR “Ovarian Reserve” OR “AMH” OR “anti-Mullerian hormone” OR “antral follicle count” OR “AFC” OR “Ovarian Function Tests”[Mesh] OR “Ovarian function” OR Gonadotoxicity OR Gonadotoxic OR “ovarian toxicity” OR “ovarian damage” OR (“DNA damage” OR “vascular toxicity” OR “oxidative stress”) AND (follicle OR ovary OR ovarian OR gonads)) |
| PUBMED – merge 2 | (Radiotherapy[Mesh] OR Radiation OR Radiotherapy) AND (“Infertility”[Mesh] OR infertility OR infertile OR “resumption of menses” OR “resumption of menstruation” OR “Primary Ovarian Insufficiency”[Mesh] OR “Premature Ovarian Insufficiency” OR “Primary Ovarian Insufficiency” OR “Premature Ovarian Failure” OR “menopause” OR “Ovarian Reserve”[Mesh] OR “Ovarian Reserve” OR “AMH” OR “anti-Mullerian hormone” OR “antral follicle count” OR “AFC” OR “Ovarian Function Tests”[Mesh] OR “Ovarian function” OR Gonadotoxicity OR Gonadotoxic OR “ovarian toxicity” OR “ovarian damage” OR (“DNA damage” OR “vascular toxicity” OR “oxidative stress”) AND (follicle OR ovary OR ovarian OR gonads)) |
| COCHRANE - merge | (“Antineoplastic Agents” OR chemotherapy OR anthracycline OR Immunosuppression OR “Alkylating Agents” OR Cyclophosphamide OR “Hematopoietic Stem Cell Transplantation” OR “immunosuppressive therapy” OR “Stem Cell Transplantation” OR Radiotherapy OR Radiation OR Radiotherapy) AND (“Ovarian Reserve” OR AMH OR “anti-Mullerian hormone” OR “antral follicle count” OR AFC OR “Ovarian Function Tests” OR “Ovarian function” OR Gonadotoxicity OR Gonadotoxic OR “ovarian toxicity” OR “ovarian damage” OR (“DNA damage” OR “vascular toxicity” OR “oxidative stress”) AND (follicle OR ovary OR ovarian OR gonads)) OR infertility OR infertile OR “resumption of menses” OR “resumption of menstruation” OR “Premature Ovarian Insufficiency” OR “Primary Ovarian Insufficiency” OR “Premature Ovarian Failure” OR menopause) |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
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| Ademuyiwa FO, Cyr A, Ivanovich J, Thomas MA. Managing breast cancer in younger women: challenges and solutions. <i>Breast Cancer (Dove Med Press)</i> 2016;8: 1-12. | Narrative review with limited data related to the topic of the current topic (more updated data available in more recent reviews) |
| Aikawa NE, Sallum AM, Pereira RM, Suzuki L, Viana VS, Bonfa E, Silva CA. Subclinical impairment of ovarian reserve in juvenile systemic lupus erythematosus after cyclophosphamide therapy. <i>Clin Exp Rheumatol</i> 2012;30: 445-449. | Larger studies available on the topic |
| Akawatcharangura P, Taechakraichana N, Osiri M. Prevalence of premature ovarian failure in systemic lupus erythematosus patients treated with immunosuppressive agents in Thailand. <i>Lupus</i> 2016;25: 436-444. | Larger studies available on the topic |
| Alarfaj AS, Khalil N. Fertility, ovarian failure, and pregnancy outcome in SLE patients treated with intravenous cyclophosphamide in Saudi Arabia. <i>Clin Rheumatol</i> 2014;33: 1731-1736. | Larger studies available on the topic |
| Anders C, Marcom PK, Peterson B, Gu L, Unruhe S, Welch R, Lyons P, Behera M, Copland S, Kimmick G et al. A pilot study of predictive markers of chemotherapy-related amenorrhea among premenopausal women with early stage breast cancer. <i>Cancer Invest</i> 2008;26: 286-295. | Study included in recent systematic reviews (Freour EJC 2017 and Peigne <i>Reprod Biol End</i> 2014) |
| Anderson D, Seib C, Tjondronegoro D, Turner J, Monterosso L, McGuire A, Porter-Steele J, Song W, Yates P, King N et al. The Women's wellness after cancer program: a multisite, single-blinded, randomised controlled trial protocol. <i>BMC Cancer</i> 2017;17: 98. | Publication type (study protocol, no results); topic different from the one of the current question |
| Angeliki M, Alison BM, Stratakis CA, Maya L. Irreversible primary amenorrhoea secondary to uterine damage and premature ovarian failure in Ewing's sarcoma in two patients. <i>J Pediatr Adolesc Gynecol</i> 2018. | Study including only two cases |
| Appenzeller S, Blaty PF, Costallat LT. Ovarian failure in SLE patients using pulse cyclophosphamide: comparison of different regimes. <i>Rheumatol Int</i> 2008;28: 567-571. | Larger studies available on the topic |
| Assouline E, Crocchiolo R, Prebet T, Broussais F, Coso D, Gamerre M, Vey N, Blaise D, Courbiere B. Impact of reduced-intensity conditioning allogeneic stem cell transplantation on women's fertility. <i>Clin Lymphoma Myeloma Leuk</i> 2013;13: 704-710. | Small study including only 22 evaluable patients (with different diseases and different chemotherapy agents) |
| Bala J, Seth S, Dhankhar R, Ghalaut VS. Chemotherapy: Impact on Anti-Mullerian Hormone Levels in Breast Carcinoma. <i>J Clin Diagn Res</i> 2016;10: Bc19-21. | Updated and larger studies on the topic |
| Barnabei A, Strigari L, Marchetti P, Sini V, De Vecchis L, Corsello SM, Torino F. Predicting Ovarian Activity in Women Affected by Early Breast Cancer: A Meta-Analysis-Based Nomogram. <i>Oncologist</i> 2015;20: 1111-1118. | Studies included in this article are also included in a recent systematic review (Freour EJC 2017) as well as in the metanalysis by Silva Hum <i>Reprod</i> 2016 |
| Barr RD. Risk of premature menopause after treatment for Hodgkin's lymphoma. <i>J Natl Cancer Inst</i> 2014;106. | Editorial article by Swerdlow et al |
| Bates GE, Taub RN, West H. Fertility and Cancer Treatment. <i>JAMA Oncol</i> 2016;2: 284. | Patient page, very short summary on the topic of fertility preservation (more updated data available in more recent reviews) |
| Ben-Aharon I, Granot T, Meizner I, Hasky N, Tobar A, Rizel S, Yerushalmi R, Ben-Haroush A, Fisch B, Stemmer SM. Long-Term Follow-Up of Chemotherapy-Induced Ovarian Failure in Young Breast Cancer Patients: The Role of Vascular Toxicity. <i>Oncologist</i> 2015;20: 985-991. | Study included in a recent systematic review (Freour EJC 2017) |
| Ben-Aharon I, Shalgi R. What lies behind chemotherapy-induced ovarian toxicity? <i>Reproduction</i> 2012;144: 153-163. | Narrative review (more updated data available in more recent reviews) |
| Bentivegna E, Maulard A, Pautier P, Chargari C, Gouy S, Morice P. Fertility results and pregnancy outcomes after conservative treatment of cervical cancer: a systematic review of the literature. <i>Fertil Steril</i> 2016;106: 1195-1211.e1195. | Narrative review outside the topic of the current question (this review assessed the efficacy in terms of fertility outcomes of conservative cervical surgery) |
| Biasoli I, Falorio S, Luminari S, Spector N, Federico M. Fertility in female survivors of Hodgkin's lymphoma. <i>Rev Bras Hematol Hemoter</i> 2012;34: 48-53. | Narrative review (more updated data available in more recent reviews) |
| Biedka M, Kuzba-Kryszak T, Nowikiewicz T, Zyromska A. Fertility impairment in radiotherapy. <i>Contemp Oncol (Pozn)</i> 2016;20: 199-204. | Narrative review (more updated data available in more recent reviews) |
| Bines J, Oleske DM, Cobleigh MA. Ovarian function in premenopausal women treated with adjuvant chemotherapy for breast cancer. <i>J Clin Oncol</i> 1996;14: 1718-1729. | Narrative/systematic review (more updated data available in more recent reviews) |
| Blumenfeld Z, Dann E, Avivi I, Epelbaum R, Rowe JM. Fertility after treatment for Hodgkin's disease. <i>Ann Oncol</i> 2002;13 Suppl 1: 138-147. | Narrative review (more updated data available in more recent reviews) |
| Blumenfeld Z, Ritter M, Shen-Orr Z, Shariki K, Ben-Shahar M, Haim N. Inhibin A concentrations in the sera of young women during and after chemotherapy for lymphoma: correlation with ovarian toxicity. <i>Am J Reprod Immunol</i> 1998;39: 33-40. | Relevant outcomes not assessed; small number of patients and most of them |

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| | treated with GnRHa during chemotherapy (true POI data and inhibin A results not evaluable) |
| Bohnen D, Burkhard FC, Mills R, Sonntag RW, Studer UE. Fertility and sexual function following orchiectomy and 2 cycles of chemotherapy for stage I high risk nonseminomatous germ cell cancer. <i>J Urol</i> 2001;165: 441-444. | This article addressed the issues of the current question but in men |
| Bokemeyer C, Schmoll HJ, van Rhee J, Kuczyk M, Schuppert F, Poliwooda H. Long-term gonadal toxicity after therapy for Hodgkin's and non-Hodgkin's lymphoma. <i>Ann Hematol</i> 1994;68: 105-110. | Larger studies available on the topic |
| Boltezar L, Pintaric K, Jezersek Novakovic B. Fertility in young patients following treatment for Hodgkin's lymphoma: a single center survey. <i>J Assist Reprod Genet</i> 2016;33: 325-333. | Larger studies available on the topic |
| Brennemann W, Stoffel-Wagner B, Helmers A, Mezger J, Jager N, Klingmuller D. Gonadal function of patients treated with cisplatin based chemotherapy for germ cell cancer. <i>J Urol</i> 1997;158: 844-850. | This article addressed the issues of the current question but in men |
| Brooke, R.J., et al., A High-risk Haplotype for Premature Menopause in Childhood Cancer Survivors Exposed to Gonadotoxic Therapy. <i>J Natl Cancer Inst</i> , 2018, 110(8): p. 895-904. | Childhood Cancer |
| Brougham MF, Crofton PM, Johnson EJ, Evans N, Anderson RA, Wallace WH. Anti-Mullerian hormone is a marker of gonadotoxicity in pre- and postpubertal girls treated for cancer: a prospective study. <i>J Clin Endocrinol Metab</i> 2012;97: 2059-2067. | Study included in a recent systematic review (Peigne <i>Reprod Biol End</i> 2014) |
| Browne H, Armstrong A, Decherney A, Babb R, Illei G, Segars J, Pavletic S. Assessment of ovarian function with anti-Mullerian hormone in systemic lupus erythematosus patients undergoing hematopoietic stem cell transplant. <i>Fertil Steril</i> 2009;91: 1529-1532. | Larger studies available on the topic (this study included only 6 patients) |
| Brydoy M, Fossa SD, Dahl O, Bjoro T. Gonadal dysfunction and fertility problems in cancer survivors. <i>Acta Oncol</i> 2007;46: 480-489. | Narrative review (more updated data available in more recent reviews) |
| Buzzoni R, Bonadonna G, Valagussa P, Zambetti M. Adjuvant chemotherapy with doxorubicin plus cyclophosphamide, methotrexate, and fluorouracil in the treatment of resectable breast cancer with more than three positive axillary nodes. <i>Journal of clinical oncology</i> 1991;9: 2134-2140. | Relevant outcomes not assessed (amenorrhea during treatment only was assessed; POI risk with the treatment not evaluable) |
| Byrne J. Long-term genetic and reproductive effects of ionizing radiation and chemotherapeutic agents on cancer patients and their offspring. <i>Teratology</i> 1999;59: 210-215. | Narrative review (more updated data available in more recent reviews) |
| Ceccarelli C, Bencivelli W, Morciano D, Pinchera A, Pacini F. 131I therapy for differentiated thyroid cancer leads to an earlier onset of menopause: results of a retrospective study. <i>J Clin Endocrinol Metab</i> 2001;86: 3512-3515. | Study included in the paper by Clement 2015 |
| Chasle S, How CC. The effect of cytotoxic chemotherapy on female fertility. <i>Eur J Oncol Nurs</i> 2003;7: 91-98. | Narrative review (more updated data available in more recent reviews) |
| Chaudhary UB, Haldas JR. Long-term complications of chemotherapy for germ cell tumours. <i>Drugs</i> 2003;63: 1565-1577. | This article addressed the issues of the current question but in men |
| Chen WY, Manson JE. Premature ovarian failure in cancer survivors: new insights, looming concerns. <i>J Natl Cancer Inst</i> 2006;98: 880-881. | Editorial on an article addressing this topic but in survivors of childhood cancers |
| Cheng YC, Saliba RM, Rondon G, Giralt SA, Lu KH, Bodurka DC, Gershenson DM, Champlin RE, Ueno NT. Low prevalence of premature ovarian failure in women given reduced-intensity conditioning regimens for hematopoietic stem-cell transplantation. <i>Haematologica</i> 2005;90: 1725-1726. | Larger studies available on the topic |
| Chiaffarino F, Pelucchi C, Parazzini F, Negri E, Franceschi S, Talamini R, Conti E, Montella M, La Vecchia C. Reproductive and hormonal factors and ovarian cancer. <i>Ann Oncol</i> 2001;12: 337-341. | Relevant outcomes not assessed (article not focused on POI risk) |
| Clark ST, Radford JA, Crowther D, Swindell R, Shalet SM. Gonadal function following chemotherapy for Hodgkin's disease: a comparative study of MVPP and a seven-drug hybrid regimen. <i>J Clin Oncol</i> 1995;13: 134-139. | Small study including only 39 evaluable patients (more recent and larger studies included) |
| Cohen LE. Cancer treatment and the ovary: the effects of chemotherapy and radiation. <i>Ann N Y Acad Sci</i> 2008;1135: 123-125. | Narrative review (more updated data available in more recent and extensive reviews) |
| Cosgrove, C.M. and R. Salani, Ovarian effects of radiation and cytotoxic chemotherapy damage. <i>Best Pract Res Clin Obstet Gynaecol</i> , 2019, 55: p. 37-48. | not relevant |
| Counsell R, Bain G, Williams MV, Dixon AK. Artificial radiation menopause: where are the ovaries? <i>Clin Oncol (R Coll Radiol)</i> 1996;8: 250-253. | Study not focused on the topic of the current question |
| Crandall C, Petersen L, Ganz PA, Greendale GA. Association of breast cancer and its therapy with menopause-related symptoms. <i>Menopause</i> 2004;11: 519-530. | Updated and larger studies on the topic |
| Critchley HO, Wallace WH. Impact of cancer treatment on uterine function. <i>J Natl Cancer Inst Monogr</i> 2005: 64-68. | Narrative review (more updated data available in more recent reviews) |
| Dann EJ, Blumenfeld Z, Bar-Shalom R, Avivi I, Ben-Shachar M, Goor O, Libster D, Gaitini D, Rowe JM, Epelbaum R. A 10-year experience with treatment of high and standard risk Hodgkin disease: six cycles of tailored BEACOPP, with interim scintigraphy, are effective and female fertility is preserved. <i>Am J Hematol</i> 2012;87: 32-36. | Larger studies available on the topic |
| Dann EJ, Epelbaum R, Avivi I, Ben Shahar M, Haim N, Rowe JM, Blumenfeld Z. Fertility and ovarian function are preserved in women treated with an intensified regimen of cyclophosphamide, adriamycin, vincristine and prednisone (Mega-CHOP) for non-Hodgkin lymphoma. <i>Hum Reprod</i> 2005;20: 2247-2249. | Relevant outcomes not assessed: small number of patients and most of them treated with GnRHa during |

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| | chemotherapy (true POI data not evaluable) |
| David M, Kroncke T. Uterine Fibroid Embolisation - Potential Impact on Fertility and Pregnancy Outcome. <i>Geburtshilfe Frauenheilkd</i> 2013;73: 247-255. | Narrative review |
| D'Avila AM, Biolchi V, Capp E, Corleta H. Age, anti-mullerian hormone, antral follicles count to predict amenorrhea or oligomenorrhea after chemotherapy with cyclophosphamide. <i>J Ovarian Res</i> 2015;8: 82. | Study included in a recent systematic review (Freour EJC 2017) |
| D'Avila AM, Capp E, Corleta HVE. Antral Follicles Count and Anti-Mullerian Hormone Levels after Gonadotoxic Chemotherapy in Patients with Breast Cancer: Cohort Study. <i>Rev Bras Ginecol Obstet</i> 2017;39: 162-168. | Larger studies available on the topic |
| Davis AL, Klitus M, Mintzer DM. Chemotherapy-induced amenorrhea from adjuvant breast cancer treatment: the effect of the addition of taxanes. <i>Clin Breast Cancer</i> 2005;6: 421-424. | Study included in the systematic review and meta-analysis by Zhao (Breast Cancer Res Treat 2014) |
| De Bruin ML, Huisbrink J, Hauptmann M, Kuenen MA, Ouwens GM, van't Veer MB, Aleman BM, van Leeuwen FE. Treatment-related risk factors for premature menopause following Hodgkin lymphoma. <i>Blood</i> 2008;111: 101-108. | Study included in the systematic review by Overbeek (Cancer Treat Rev 2017) |
| de Groot, S., et al., Effects of controlled ovarian stimulation on toxicity of TAC chemotherapy in early breast cancer patients. <i>Cancer Manag Res</i> , 2018. 10: p. 3931-3935. | not relevant for the key question |
| de la Haba-Rodriguez J, Calderay M. Impact of breast cancer treatment on fertility. <i>Breast Cancer Res Treat</i> 2010;123 Suppl 1: 59-63. | Narrative review (more updated data available in more recent reviews) |
| Decanter C, Cloquet M, Dassonneville A, D'Orazio E, Mailliez A, Pigny P. Different patterns of ovarian recovery after cancer treatment suggest various individual ovarian susceptibilities to chemotherapy. <i>Reprod Biomed Online</i> 2018;36: 711-718. | Larger studies available on the topic |
| Decanter C, Morschhauser F, Pigny P, Lefebvre C, Gallo C, Dewailly D. Anti-Mullerian hormone follow-up in young women treated by chemotherapy for lymphoma: preliminary results. <i>Reprod Biomed Online</i> 2010;20: 280-285. | Study included in a recent systematic review (Peigne <i>Reprod Biol End</i> 2014) |
| DeSantis M, Albrecht W, Holtl W, Pont J. Impact of cytotoxic treatment on long-term fertility in patients with germ-cell cancer. <i>Int J Cancer</i> 1999;83: 864-865. | This article addressed the issues of the current question but in men |
| Devecioglu TY, Aydogan F, Omurtag GZ, Bese NS, Sardas S. Investigation of genotoxicity risk and DNA repair capacity in breast cancer patients using anastrozole. <i>North Clin Istanb</i> 2018;5: 6-13. | Relevant outcomes not assessed (article in post-menopausal women on AI mechanisms of action) |
| DeWire M, Green DM, Sklar CA, Merchant TE, Wallace D, Lin T, Vern-Gross T, Kun LE, Krasin MJ, Boyett JM et al. Pubertal development and primary ovarian insufficiency in female survivors of embryonal brain tumors following risk-adapted craniospinal irradiation and adjuvant chemotherapy. <i>Pediatr Blood Cancer</i> 2015;62: 329-334. | Study on childhood cancer |
| do Rosario PW, Barroso AL, Rezende LL, Padrao EL, Borges MA, Purisch S. Malformations in the offspring of women with thyroid cancer treated with radioiodine for the ablation of thyroid remnants. <i>Arq Bras Endocrinol Metabol</i> 2006;50: 930-933. | Topic already covered in the more updated paper by Clement 2015 |
| Dottorini ME, Lomuscio G, Mazzucchelli L, Vignati A, Colombo L. Assessment of female fertility and carcinogenesis after iodine-131 therapy for differentiated thyroid carcinoma. <i>J Nucl Med</i> 1995;36: 21-27. | Study included in the systematic review by Clement (Cancer Treat Rev 2015) |
| Duffy C, Allen S. Medical and psychosocial aspects of fertility after cancer. <i>Cancer J</i> 2009;15: 27-33. | Narrative review (data available also in other more recent reviews) |
| Dunlop CE, Anderson RA. Uses of anti-Mullerian hormone (AMH) measurement before and after cancer treatment in women. <i>Maturitas</i> 2015;80: 245-250. | Systematic/narrative review on the same topic by Peigne 2014 |
| Dyer G, Gilroy N, Bradford J, Brice L, Kabir M, Greenwood M, Larsen SR, Moore J, Hertzberg M, Kwan J et al. A survey of fertility and sexual health following allogeneic haematopoietic stem cell transplantation in New South Wales, Australia. <i>Br J Haematol</i> 2016;172: 592-601. | Relevant outcomes not assessed (article focused on sexuality after treatment) |
| Eelink CM, Incrocci L, Witte BI, Meurs S, Visser O, Huijgens P, Verdonck-de Leeuw IM. Fertility and sexual function in female Hodgkin lymphoma survivors of reproductive age. <i>J Clin Nurs</i> 2013;22: 3513-3521. | Larger studies available on the topic |
| Eiermann W, Graf E, Ataseven B, Conrad B, Hilfrich J, Massinger-Biebl H, Vescia S, Loibl S, Minckwitz G, Schumacher M et al. Dose-intensified epirubicin versus standard-dose epirubicin/cyclophosphamide followed by CMF in breast cancer patients with 10 or more positive lymph nodes: results of a randomised trial (GABG-IV E-93) - the German Adjuvant Breast Cancer Group. <i>European journal of cancer (oxford, england : 1990)</i> 2010;46: 84-94. | Relevant outcomes not assessed (article addressing old chemotherapy regimen and reporting menstrual function in women who received GnRHa during chemotherapy) |
| El Issaoui M, Giorgione V, Mamsen LS, Rechnitzer C, Birkebaek N, Clausen N, Kelsey TW, Andersen CY. Effect of first line cancer treatment on the ovarian reserve and follicular density in girls under the age of 18 years. <i>Fertil Steril</i> 2016;106: 1757-1762.e1751. | Study on a different topic than the current question (ovarian tissue cryopreservation before and after cancer treatment); focused to children |
| Elis A, Tevet A, Yerushalmi R, Blickstein D, Bairy O, Dann EJ, Blumenfeld Z, Abraham A, Manor Y, Shpilberg O et al. Fertility status among women treated for aggressive non-Hodgkin's lymphoma. <i>Leuk Lymphoma</i> 2006;47: 623-627. | Larger studies available on the topic |
| Elkin EB, Weinstein MC, Kuntz KM, Bunnell CA, Weeks JC. Adjuvant ovarian suppression versus chemotherapy for premenopausal, hormone-responsive breast cancer: quality of life and efficacy tradeoffs. <i>Breast Cancer Res Treat</i> 2005;93: 25-34. | Relevant outcomes not assessed (article addressing impact of different treatments on QoL not risk of POI) |
| Ewertz M, Jensen AB. Late effects of breast cancer treatment and potentials for rehabilitation. <i>Acta Oncol</i> 2011;50: 187-193. | Narrative review focused mainly on other topics than |

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| | fertility (plus more updated data available in more recent reviews) |
| Falorio S, Biasoli I, Luminari S, Quintana G, Musso M, Dell'olio M, Specchia MR, di Renzo N, Cesaretti M, Buda G et al. Risk factors for impaired gonadal function in female Hodgkin lymphoma survivors: final analysis of a retrospective multicenter joint study from Italian and Brazilian Institutions. <i>Hematol Oncol</i> 2013;31: 72-78. | Study included in the systematic review by Overbeek (Cancer Treat Rev 2017) |
| Fleischer RT, Vollenhoven BJ, Weston GC. The effects of chemotherapy and radiotherapy on fertility in premenopausal women. <i>Obstet Gynecol Surv</i> 2011;66: 248-254. | Narrative review (more updated data available in more recent reviews) |
| Fornier MN, Modi S, Panageas KS, Norton L, Hudis C. Incidence of chemotherapy-induced, long-term amenorrhea in patients with breast carcinoma age 40 years and younger after adjuvant anthracycline and taxane. <i>Cancer</i> 2005;104: 1575-1579. | Study included in the systematic review and metanalysis by Zhao (Breast Cancer Res Treat 2014) |
| Fossa SD, Dahl AA. Fertility and sexuality in young cancer survivors who have adult-onset malignancies. <i>Hematol Oncol Clin North Am</i> 2008;22: 291-303, vii. | Narrative review (more updated data available in more recent reviews) |
| Freycon, F., L. Casagrande, and B. Trombert-Paviot, The impact of severe late-effects after 12 Gy fractionated total body irradiation and allogeneic stem cell transplantation for childhood leukemia (1988-2010). <i>Pediatr Hematol Oncol</i> , 2019, 36(2): p. 86-102. | Childhood Cancer |
| Gadducci A, Cosio S, Genazzani AR. Ovarian function and childbearing issues in breast cancer survivors. <i>Gynecol Endocrinol</i> 2007;23: 625-631. | Narrative review (more updated data available in more recent reviews) |
| Gaidos JKJ, Kane SV. Sexuality, Fertility, and Pregnancy in Crohn's Disease. <i>Gastroenterol Clin North Am</i> 2017;46: 531-546. | Narrative review |
| Ganz PA, Greendale GA, Petersen L, Kahn B, Bower JE. Breast cancer in younger women: reproductive and late health effects of treatment. <i>J Clin Oncol</i> 2003;21: 4184-4193. | Updated and larger studies on the topic |
| Gargus, E., et al, Management of Primary Ovarian Insufficiency Symptoms in Survivors of Childhood and Adolescent Cancer. <i>J Natl Compr Canc Netw</i> , 2018, 16(9): p. 1137-1149. | not relevant for the key question |
| George, S.A., et al, Early Detection of Ovarian Dysfunction by Anti-Mullerian Hormone in Adolescent and Young Adult-Aged Survivors of Childhood Cancer. <i>J Adolesc Young Adult Oncol</i> , 2019, 8(1): p. 18-25. | Childhood Cancer |
| Ghaleb RM, Fahmy KA. Anti-Mullerian hormone: a marker for ovarian function in systemic lupus erythematosus patients treated with cyclophosphamide. <i>Joint Bone Spine</i> 2013;80: 434-435. | Letter to the editor: small cohort of patients (AMH in patients with systemic lupus erythematosus) |
| Gharwan H, Neary NM, Link M, Hsieh MM, Fitzhugh CD, Sherins RJ, Tisdale JF. Successful fertility restoration after allogeneic hematopoietic stem cell transplantation. <i>Endocr Pract</i> 2014;20: e157-161. | This article addressed the issues of the current question but in one man |
| Gilbert-Barness E. Teratogenic causes of malformations. <i>Ann Clin Lab Sci</i> 2010;40: 99-114. | Narrative review focused on a different topic than the current question (teratogenic exposure and malformations) |
| Gini, G., et al, Gonadal Function Recovery and Fertility in Women Treated with Chemo- and/or Radiotherapy for Hodgkin's and Non-Hodgkin Lymphoma. <i>Chemotherapy</i> , 2019, 64(1): p. 36-41. | not relevant for the key question |
| Giuseppe L, Attilio G, Edoardo DN, Loredana G, Cristina L, Vincenzo L. Ovarian function after cancer treatment in young women affected by Hodgkin disease (HD). <i>Hematology</i> 2007;12: 141-147. | Study included in the systematic review by Overbeek (Cancer Treat Rev 2017); to be included in GnRHa question |
| Glantz JC. Reproductive toxicology of alkylating agents. <i>Obstet Gynecol Surv</i> 1994;49: 709-715. | Narrative review (more updated data available in more recent reviews) |
| Goldfarb S, Mulhall J, Nelson C, Kelvin J, Dickler M, Carter J. Sexual and reproductive health in cancer survivors. <i>Semin Oncol</i> 2013;40: 726-744. | Narrative review more focused on treatment of sexual problems (plus more updated data available in more recent reviews) |
| Goldstein A, Wolfe LA. The elusive magic pill: finding effective therapies for mitochondrial disorders. <i>Neurotherapeutics</i> 2013;10: 320-328. | Narrative review not on the topic of the current question (the article is focused on treatment for mitochondrial disorders and not impact of mitochondrial disorders on fertility outcomes) |
| Gordon W, Jr., Siegmund K, Stanic TH, McKnight B, Harris IT, Carroll PR, Paradelo JC, Meyers FJ, Chapman RA, Meyskens FL, Jr. A study of reproductive function in patients with seminoma treated with radiotherapy and orchidectomy: (SWOG-8711). Southwest Oncology Group. <i>Int J Radiat Oncol Biol Phys</i> 1997;38: 83-94. | This article addressed the issues of the current question but in men |
| Griesshammer M, Bergmann L, Pearson T. Fertility, pregnancy and the management of myeloproliferative disorders. <i>Baillieres Clin Haematol</i> 1998;11: 859-874. | Narrative review (more updated data available in more recent reviews) |
| Grigg A. The impact of conventional and high-dose therapy for lymphoma on fertility. <i>Clin Lymphoma</i> 2004;5: 84-88. | Narrative review (more updated data available in more recent reviews) |
| Gupta AA, Lee Chong A, Deveault C, Traubici J, Maloney AM, Knight S, Lorenzo A, Allen L. Anti-Mullerian Hormone in Female Adolescent Cancer Patients Before, During, and After Completion of Therapy: A Pilot Feasibility Study. <i>J Pediatr Adolesc Gynecol</i> 2016;29: 599-603. | Study focused on adolescent cancer patients only; other |

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| | larger studies available on AMH post-treatment |
| Hahn HS, Yoon SG, Hong JS, Hong SR, Park SJ, Lim JY, Kwon YS, Lee IH, Lim KT, Lee KH et al. Conservative treatment with progestin and pregnancy outcomes in endometrial cancer. <i>Int J Gynecol Cancer</i> 2009;19: 1068-1073. | Relevant intervention not included (the study assessed the efficacy of conservative treatment with progestin for endometrial cancer) |
| Hamy AS, Porcher R, Cuvier C, Giacchetti S, Schlageter MH, Coussieu C, Gronier H, Feugeas JP, Adoui N, Lacorte JM et al. Ovarian reserve in breast cancer: assessment with anti-Mullerian hormone. <i>Reprod Biomed Online</i> 2014;29: 573-580. | Study included in a recent systematic review (Freour EJC 2017) |
| Harbeck N, Latta S. Chemotherapy is not the end of the road in young cancer patients who still want to become pregnant. <i>Onkologie</i> 2010;33: 651-652. | Editorial on an article addressing a case report on this topic |
| Harward LE, Mitchell K, Pieper C, Copland S, Criscione-Schreiber LG, Clowse ME. The impact of cyclophosphamide on menstruation and pregnancy in women with rheumatologic disease. <i>Lupus</i> 2013;22: 81-86. | Larger studies available on the topic |
| Haukvik UK, Dieset I, Bjoro T, Holte H, Fossa SD. Treatment-related premature ovarian failure as a long-term complication after Hodgkin's lymphoma. <i>Ann Oncol</i> 2006;17: 1428-1433. | Study included in the systematic review by Overbeek (<i>Cancer Treat Rev</i> 2017) |
| He H, Huang H, Yu T. Detection of DNA damage in sonochemotherapy against cisplatin-resistant human ovarian cancer cells using the modified comet assay. <i>Int J Radiat Biol</i> 2014;90: 897-902. | Relevant outcomes not assessed (article not focused on POI risk) |
| Henry NL, Xia R, Schott AF, McConnell D, Banerjee M, Hayes DF. Prediction of postchemotherapy ovarian function using markers of ovarian reserve. <i>Oncologist</i> 2014;19: 68-74. | Study included in recent systematic reviews (Freour EJC 2017 and Peigne <i>Reprod Biol End</i> 2014) plus in another recent systematic review and meta-analysis (Silva <i>Hum Reprod</i> 2016) |
| Homer MV, Charo LM, Natarajan L, Haunschild C, Chung K, Mao JJ, DeMichele AM, Su HI. Genetic variants of age at menopause are not related to timing of ovarian failure in breast cancer survivors. <i>Menopause</i> 2017;24: 663-668. | Larger studies available on the topic |
| Howard GC. Fertility following cancer therapy. <i>Clin Oncol (R Coll Radiol)</i> 1991;3: 283-287. | Narrative review (more updated data available in more recent reviews) |
| Hsu SD, Lee SY, Lin KT, Lin CS, Chien WC, Chen CJ, Chung CH, Chang WK. Risk of infertility following pelvic angiographic embolization in female patients with pelvic fractures: A nationwide population-based cohort study in Taiwan. <i>PLoS One</i> 2017;12: e0174733. | Retrospective population-based study; small number of cases; only infertility was assessed as outcomes |
| Hulvat MC, Jeruss JS. Maintaining fertility in young women with breast cancer. <i>Curr Treat Options Oncol</i> 2009;10: 308-317. | Narrative review (more updated data available in more recent reviews) |
| Huong DL, Amoura Z, Duhaut P, Sbai A, Costedoat N, Wechsler B, Piette JC. Risk of ovarian failure and fertility after intravenous cyclophosphamide. A study in 84 patients. <i>J Rheumatol</i> 2002;29: 2571-2576. | Larger studies available on the topic |
| Imai A, Ichigo S, Matsunami K, Takagi H, Kawabata I. Ovarian function following targeted anti-angiogenic therapy with bevacizumab. <i>Mol Clin Oncol</i> 2017;8: 807-810. | Narrative review not reporting clinical data to estimate POI risk with bevacizumab |
| Iorio R, Castellucci A, Ventriglia G, Teoli F, Cellini V, Macchiarelli G, Cecconi S. Ovarian toxicity: from environmental exposure to chemotherapy. <i>Curr Pharm Des</i> 2014;20: 5388-5397. | Narrative review (more updated data available in more recent reviews) |
| Ivancsits S, Pilger A, Diem E, Jahn O, Rudiger HW. Cell type-specific genotoxic effects of intermittent extremely low-frequency electromagnetic fields. <i>Mutat Res</i> 2005;583: 184-188. | Relevant outcomes not assessed (study that analyzed the effect on cells of exposure to extremely low-frequency electromagnetic fields) |
| Iwase A, Nakamura T, Nakahara T, Goto M, Kikkawa F. Anti-Mullerian hormone and assessment of ovarian reserve after ovarian toxic treatment: a systematic narrative review. <i>Reprod Sci</i> 2015;22: 519-526. | Systematic review on the same topic by Peigne 2014 |
| Janssen NM, Genta MS. The effects of immunosuppressive and anti-inflammatory medications on fertility, pregnancy, and lactation. <i>Arch Intern Med</i> 2000;160: 610-619. | Narrative review (more updated data available in more recent reviews) |
| Johnson L, Sammel MD, Schanne A, Lechtenberg L, Prewitt M, Gracia C. Female cancer survivors exposed to alkylating-agent chemotherapy have unique reproductive hormone profiles. <i>Fertil Steril</i> 2016;106: 1793-1799.e1792. | Relevant outcomes not assessed (POI risk based on urinary metabolites); small cohort of patients |
| Jones AL. Fertility and pregnancy after breast cancer. <i>Breast</i> 2006;15 Suppl 2: S41-46. | Narrative review (more updated data available in more recent reviews) |
| Kang H, Kim TJ, Kim WY, Choi CH, Lee JW, Kim BG, Bae DS. Outcome and reproductive function after cumulative high-dose combination chemotherapy with bleomycin, etoposide and cisplatin (BEP) for patients with ovarian endodermal sinus tumor. <i>Gynecol Oncol</i> 2008;111: 106-110. | Another larger study on the topic (Gershenson et al) has been included on this topic |
| Kasum M, Beketic-Oreskovic L, Peddi PF, Oreskovic S, Johnson RH. Fertility after breast cancer treatment. <i>Eur J Obstet Gynecol Reprod Biol</i> 2014;173: 13-18. | Narrative review (more updated data available in more recent reviews) |

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| Katsifis GE, Tzioufas AG. Ovarian failure in systemic lupus erythematosus patients treated with pulsed intravenous cyclophosphamide. <i>Lupus</i> 2004;13: 673-678. | Narrative review (more updated data available in more recent reviews) |
| Kesic V. Fertility after the treatment of gynecologic tumors. <i>Recent Results Cancer Res</i> 2008;178: 79-95. | Narrative review (more updated data available in more recent reviews) |
| Kim HA, Choi J, Park CS, Seong MK, Hong S, Kim JS, Park IC, Lee JK, Noh WC. Post-chemotherapy serum anti-mullerian hormone level predicts ovarian function recovery. <i>Endocr Connect</i> 2018. | Larger studies available on the topic |
| kim MK, Yoon BS, Park H, Seong SJ, Chung HH, Kim JW, Kang SB. Conservative treatment with medroxyprogesterone acetate plus levonorgestrel intrauterine system for early-stage endometrial cancer in young women: pilot study. <i>Int J Gynecol Cancer</i> 2011;21: 673 | Relevant outcomes not assessed (article addressing alendronate on bone mineral density) |
| Kim MK, Yoon BS, Park H, Seong SJ, Chung HH, Kim JW, Kang SB. Conservative treatment with medroxyprogesterone acetate plus levonorgestrel intrauterine system for early-stage endometrial cancer in young women: pilot study. <i>Int J Gynecol Cancer</i> 2011;21: 673-677. | Relevant outcomes not assessed (article addressing conservative treatment for endometrial cancer) |
| Kim, H.A., et al., Post-chemotherapy serum anti-Mullerian hormone level predicts ovarian function recovery. <i>Endocr Connect</i> , 2018. 7(8): p. 949-956. | AMH |
| Knobf MT. Reproductive and hormonal sequelae of chemotherapy in women. <i>Cancer Nurs</i> 2006;29: 60-65. | Narrative review (more updated data available in more recent reviews) |
| Koga C, Akiyoshi S, Ishida M, Nakamura Y, Ohno S, Tokunaga E. Chemotherapy-induced amenorrhea and the resumption of menstruation in premenopausal women with hormone receptor-positive early breast cancer. <i>Breast Cancer</i> 2017;24: 714-719. | Larger studies available on the topic |
| Kulkarni SS, Sastry PS, Saikia TK, Parikh PM, Gopal R, Advani SH. Gonadal function following ABVD therapy for Hodgkin's disease. <i>Am J Clin Oncol</i> 1997;20: 354-357. | Study including men only |
| Kumar N, Allen KA, Riccardi D, Bercu BB, Cantor A, Minton S, Balducci L, Jacobsen PB. Fatigue, weight gain, lethargy and amenorrhea in breast cancer patients on chemotherapy: is subclinical hypothyroidism the culprit? <i>Breast Cancer Res Treat</i> 2004;83: 149-159. | Updated and larger studies on the topic |
| Kunneman M, Pieterse AH, Stiggelbout AM, Marijnen CA. Which benefits and harms of preoperative radiotherapy should be addressed? A Delphi consensus study among rectal cancer patients and radiation oncologists. <i>Radiother Oncol</i> 2015;114: 212-217. | Relevant outcomes not assessed (survey on agreement between doctors and patients on most important issues, including fertility) |
| Lagana AS, Barbaro L, Pizzo A. Evaluation of ovarian function and metabolic factors in women affected by polycystic ovary syndrome after treatment with D-Chiro-Inositol. <i>Arch Gynecol Obstet</i> 2015;291: 1181-1186. | Relevant outcomes not assessed (study assessing the efficacy of d-chiro-inositol treatment in patients with PCOS) |
| Langan RC, Prieto PA, Sherry RM, Zlott D, Wunderlich J, Csako G, Costello R, White DE, Rosenberg SA, Yang JC. Assessment of ovarian function after preparative chemotherapy and total body radiation for adoptive cell therapy. <i>J Immunother</i> 2011;34: 397-402. | Study including a small number of patients treated with a non widely adopted treatment |
| Lasica M, Taylor E, Bhattacharyya P, Bennett A, Cooke RE, Stern C, Agresta F, Ayton R, Grigg A. Fertility in premenopausal women post autologous stem cell transplant with BEAM conditioning. <i>Eur J Haematol</i> 2016;97: 348-352. | Relevant outcomes not assessed (not clear definition of POI, mainly focused on chances of post-treatment pregnancies); very small retrospective study |
| Lawrenz B, Mahajan N, Fatemi HM. The effects of cancer therapy on women's fertility: what do we know now? <i>Future Oncol</i> 2016;12: 1721-1729. | Narrative review (more updated data available in more recent reviews) |
| Lee BC, Yen RF, Lin CL, Liang JA, Lin MC, Kao CH. Pregnancy Incidence in Female Nasopharyngeal Carcinoma Survivors of Reproductive Age: A Population-Based Study. <i>Medicine (Baltimore)</i> 2016;95: e3729. | Relevant outcomes not assessed (article not focused on POI risk, only fertility rates were reported) |
| Lee S, Kil WJ, Chun M, Jung YS, Kang SY, Kang SH, Oh YT. Chemotherapy-related amenorrhea in premenopausal women with breast cancer. <i>Menopause</i> 2009;16: 98-103. | Study included in two recent systematic reviews and metaanalyses (Silva <i>Hum Reprod</i> 2016 and Zhao <i>Breast Cancer Res Treat</i> 2014) |
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| Li XS, Lv Q, Du ZG, Chen J. Prediction of ovarian function in premenopausal breast cancer patients with amenorrhoea after chemotherapy: a simple clinical score. <i>Springerplus</i> 2016;5: 1052. | Relevant outcomes not assessed (article focused on the development of a method to predict ovarian function after treatment) |
| Lie Fong S, Lugtenburg PJ, Schipper I, Themmen AP, de Jong FH, Sonneveld P, Laven JS. Anti-mullerian hormone as a marker of ovarian function in women after chemotherapy and radiotherapy for haematological malignancies. <i>Hum Reprod</i> 2008;23: 674-678. | Study included in a recent systematic review (Peigne <i>Reprod Biol End</i> 2014) |
| Liem GS, Mo FK, Pang E, Suen JJ, Tang NL, Lee KM, Yip CH, Tam WH, Ng R, Koh J et al. Chemotherapy-Related Amenorrhea and Menopause in Young Chinese Breast Cancer Patients: Analysis on Incidence, Risk Factors and Serum Hormone Profiles. <i>PLoS One</i> 2015;10: e0140842. | Updated and larger studies on the topic |

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| Lo Presti A, Ruvolo G, Gancitano RA, Cittadini E. Ovarian function following radiation and chemotherapy for cancer. <i>Eur J Obstet Gynecol Reprod Biol</i> 2004;113 Suppl 1: S33-40. | Narrative review (more updated data available in more recent reviews) |
| Long JP, Wan F, Zhang F, Zhou J, Don LF. DTC chemotherapy regimen is associated with higher incidence of premature ovarian failure in women of reproductive age with breast cancer. <i>Eur Rev Med Pharmacol Sci</i> 2016;20: 1087-1092. | Investigation of the gonadotoxicity of chemotherapy regimens not used in breast cancer |
| Lower EE, Blau R, Gazder P, Tummala R. The risk of premature menopause induced by chemotherapy for early breast cancer. <i>J Womens Health Gen Med</i> 1999;8: 949-954. | Updated and larger studies on the topic |
| Magne N, Chargari C, Levy A, Rodriguez C, De Vos V, Gerbaulet A, Duvillard P, Morice P, Haie-Meder C. Clear cell adenocarcinoma of the female genital tract: long-term outcome and fertility aspects after brachytherapy aimed at a conservative treatment. <i>Int J Gynecol Cancer</i> 2012;22: 1378-1382. | Relevant outcomes not assessed (article not focused on POI risk, only fertility rates were reported) |
| Mancini J, Rey D, Preau M, Malavolti L, Moatti JP. Infertility induced by cancer treatment: inappropriate or no information provided to majority of French survivors of cancer. <i>Fertil Steril</i> 2008;90: 1616-1625. | Relevant outcomes not assessed (study focused on information to patients about infertility risks and preservation methods) |
| Martin-Suarez I, D'Cruz D, Mansoor M, Fernandes AP, Khamashta MA, Hughes GR. Immunosuppressive treatment in severe connective tissue diseases: effects of low dose intravenous cyclophosphamide. <i>Ann Rheum Dis</i> 1997;56: 481-487. | Larger studies available on the topic |
| Massenkeil G, Alexander T, Rosen O, Dorken B, Burmester G, Radbruch A, Hiepe F, Arnold R. Long-term follow-up of fertility and pregnancy in autoimmune diseases after autologous haematopoietic stem cell transplantation. <i>Rheumatol Int</i> 2016;36: 1563-1568. | Larger studies available on the topic |
| Mayorga J, Alpizar-Rodriguez D, Prieto-Padilla J, Romero-Diaz J, Cravioto MC. Prevalence of premature ovarian failure in patients with systemic lupus erythematosus. <i>Lupus</i> 2016;25: 675-683. | Menstrual function after treatment for systemic lupus erythematosus |
| McDermott EM, Powell RJ. Incidence of ovarian failure in systemic lupus erythematosus after treatment with pulse cyclophosphamide. <i>Ann Rheum Dis</i> 1996;55: 224-229. | Larger studies available on the topic |
| McKay MJ, Bull CA, Houghton CR, Langlands AO. Retention of endometrial sensitivity to hormones after radiation therapy (RT) for cervical cancer in premenopausal patients. <i>Gynecol Oncol</i> 1990;39: 236. | Letter to the editor; relevant outcomes not assessed (article addressing endometrial sensitivity to hormones after radio/chemotherapy) |
| Mead G. The effects of cancer treatment on reproductive functions. <i>Clin Med (Lond)</i> 2007;7: 544-545. | Editorial on an article addressing this topic |
| Mehta RR, Beattie CW, Das Gupta TK. Endocrine profile in breast cancer patients receiving chemotherapy. <i>Breast Cancer Res Treat</i> 1992;20: 125-132. | Updated and larger studies on the topic (CMF chemotherapy) included in the systematic review and metanalysis by Zhao (<i>Breast Cancer Res Treat</i> 2014) |
| Meirow D, Biederman H, Anderson RA, Wallace WH. Toxicity of chemotherapy and radiation on female reproduction. <i>Clin Obstet Gynecol</i> 2010;53: 727-739. | Narrative review (more updated data available in more recent reviews) |
| Meirow D, Nugent D. The effects of radiotherapy and chemotherapy on female reproduction. <i>Hum Reprod Update</i> 2001;7: 535-543. | Narrative review (more updated data available in more recent reviews) |
| Meirow D. Reproduction post-chemotherapy in young cancer patients. <i>Mol Cell Endocrinol</i> 2000;169: 123-131. | Larger studies available on the topic |
| Meneses K, Holland AC. Current evidence supporting fertility and pregnancy among young survivors of breast cancer. <i>J Obstet Gynecol Neonatal Nurs</i> 2014;43: 374-381. | Narrative review (more updated data available in more recent reviews) |
| Meng K, Tian W, Zhou M, Chen H, Deng Y. Impact of chemotherapy-induced amenorrhea in breast cancer patients: the evaluation of ovarian function by menstrual history and hormonal levels. <i>World J Surg Oncol</i> 2013;11: 101. | Study included in the systematic review and metanalysis by Zhao (<i>Breast Cancer Res Treat</i> 2014) |
| Milgrom SA, Vargas HA, Sala E, Kelvin JF, Hricak H, Goodman KA. Acute effects of pelvic irradiation on the adult uterus revealed by dynamic contrast-enhanced MRI. <i>Br J Radiol</i> 2013;86: 20130334. | Relevant outcomes not assessed (MRI to detect acute effects of pelvic radiotherapy to the uterus); very small cohort of patients |
| Minisini AM, Menis J, Valent F, Andreetta C, Alessi B, Pascoletti G, Pliga A, Fasola G, Puglisi F. Determinants of recovery from amenorrhea in premenopausal breast cancer patients receiving adjuvant chemotherapy in the taxane era. <i>Anticancer Drugs</i> 2009;20: 503-507. | Study included in the systematic review by Overbeek (<i>Cancer Treat Rev</i> 2017) |
| Mitwally MF. Effect of cancer and cancer treatment on human reproduction. <i>Expert Rev Anticancer Ther</i> 2007;7: 811-822. | Narrative review (more updated data available in more recent reviews) |
| Miyoshi Y, Yasuda K, Tachibana M, Yoshida H, Miyashita E, Miyamura T, Hashii Y, Hashimoto K, Kimura T, Ozono K. Longitudinal observation of serum anti-Mullerian hormone in three girls after cancer treatment. <i>Clin Pediatr Endocrinol</i> 2016;25: 119-126. | Larger studies available on the topic (case series on 3 cases of AMH assessment) |
| Mok CC, Lau CS, Wong RW. Risk factors for ovarian failure in patients with systemic lupus erythematosus receiving cyclophosphamide therapy. <i>Arthritis Rheum</i> 1998;41: 831-837. | Larger studies available on the topic |
| Morarji K, McArdle O, Hui K, Gingras-Hill G, Ahmed S, Greenblatt EM, Warner E, Sridhar S, Ali AMF, Azad A et al. Ovarian function after chemotherapy in young breast cancer survivors. <i>Curr Oncol</i> 2017;24: e494-e502. | Larger studies available on the topic |

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| Morice P, Pautier P, Fanchin R, Haie-Meder C, Chauveaud-Lambling A, Frydman R, Frydman N. Therapy Insight: fertility in women after cancer treatment. <i>Nat Clin Pract Endocrinol Metab</i> 2007;3: 819-826. | Narrative review (more updated data available in more recent reviews) |
| Morse H, Elfving M, Lindgren A, Wolner-Hanssen P, Andersen CY, Ora I. Acute onset of ovarian dysfunction in young females after start of cancer treatment. <i>Pediatr Blood Cancer</i> 2013;60: 676-681. | Study included in a recent systematic review (Peigne <i>Reprod Biol End</i> 2014) |
| Morse H, Elfving M, Turkiewicz A, Andersen CY, Ora I. Severe gonadotoxic insult manifests early in young girls treated for Ewing sarcoma. <i>Medicine (Baltimore)</i> 2016;95: e4512. | Study including female childhood cancer patients |
| Moss EL, Taneja S, Munir F, Kent C, Robinson L, Potdar N, Sarhanis P, McDermott H. Iatrogenic Menopause After Treatment for Cervical Cancer. <i>Clin Oncol (R Coll Radiol)</i> 2016;28: 766-775. | Narrative review outside the topic of the current question (this review assessed the consequences and not the risk of POI) |
| Nabhan SK, Bitencourt MA, Duval M, Abecasis M, Dufour C, Boudjedir K, Rocha V, Socie G, Passweg J, Goh K et al. Fertility recovery and pregnancy after allogeneic hematopoietic stem cell transplantation in Fanconi anemia patients. <i>Haematologica</i> 2010;95: 1783-1787. | Menstrual function and pregnancies after treatment with hematopoietic stem cell transplantation for Fanconi anemia |
| Najafi S, Djavid GE, Mehrdad N, Rajaii E, Alavi N, Olfatbakhsh A, Najafi M, Bahrami A, Heidari K. Taxane-based regimens as a risk factor for chemotherapy-induced amenorrhea. <i>Menopause</i> 2011;18: 208-212. | Study included in the systematic review and meta-analysis by Zhao (<i>Breast Cancer Res Treat</i> 2014) |
| Nakayama K, Milbourne A, Schover LR, Champlin RE, Ueno NT. Gonadal failure after treatment of hematologic malignancies: from recognition to management for health-care providers. <i>Nat Clin Pract Oncol</i> 2008;5: 78-89. | Narrative review (more updated data available in more recent reviews) |
| Ogilvy-Stuart AL, Clark DJ, Wallace WH, Gibson BE, Stevens RF, Shalet SM, Donaldson MD. Endocrine deficit after fractionated total body irradiation. <i>Arch Dis Child</i> 1992;67: 1107-1110. | This article addressed the issues of the current question but in children |
| Oktay K, Moy F, Titus S, Stobezki R, Turan V, Dickler M, Goswami S. Age-related decline in DNA repair function explains diminished ovarian reserve, earlier menopause, and possible oocyte vulnerability to chemotherapy in women with BRCA mutations. <i>J Clin Oncol</i> 2014;32: 1093-1094. | Letter explaining possible impact of BRCA mutations on ovarian function, fertility and gonadotoxic risk |
| Oktem O, Oktay K. Quantitative assessment of the impact of chemotherapy on ovarian follicle reserve and stromal function. <i>Cancer</i> 2007;110: 2222-2229. | Relevant outcomes not assessed (study focused on the quantification of the impact of chemotherapy on primordial follicle reserve and stromal function in human ovary) |
| Oven Ustaalioglu BB, Bilici A, Kefeli U, Seker M, Salepci T, Unal O, Gumus M. A retrospective analysis of women's chances to become pregnant after completion of chemotherapy: a single center experience. <i>J buon</i> 2011;16: 349-352. | Relevant outcomes not assessed (description of patients with post-treatment pregnancies and pregnancy outcome) |
| Pagani, O., et al., Absolute Improvements in Freedom From Distant Recurrence to Tailor Adjuvant Endocrine Therapies for Premenopausal Women: Results From TEXT and SOFT. <i>J Clin Oncol</i> , 2019; p. Jco1801967. | not relevant for the key question |
| Palinska-Rudzka, K.E., et al., Five-year study assessing the clinical utility of anti-Mullerian hormone measurements in reproductive-age women with cancer. <i>Reprod Biomed Online</i> , 2019, 39(4): p. 712-720. | AMH |
| Papadakis V, Vlachopapadopoulou E, Van Syckle K, Ganshaw L, Kalmanti M, Tan C, Sklar C. Gonadal function in young patients successfully treated for Hodgkin disease. <i>Med Pediatr Oncol</i> 1999;32: 366-372. | Larger studies available on the topic |
| Park MC, Park YB, Jung SY, Chung IH, Choi KH, Lee SK. Risk of ovarian failure and pregnancy outcome in patients with lupus nephritis treated with intravenous cyclophosphamide pulse therapy. <i>Lupus</i> 2004;13: 569-574. | Larger studies available on the topic |
| Partridge A, Gelber S, Gelber R, Castiglione-Gertsch M, Goldhirsch A, Winer E. Age of menopause among women who remain premenopausal following treatment for early breast cancer: long-term results from International Breast Cancer Study Group Trials V and VI. <i>European journal of cancer (oxford, england : 1990)</i> 2007;43: 1646-1653. | Issue of age at menopause irrespectively of POI development focused on breast cancer patients only (the study by Letourneau et al already included in the introduction) |
| Partridge AH, Ruddy KJ, Gelber S, Schapira L, Abusief M, Meyer M, Ginsburg E. Ovarian reserve in women who remain premenopausal after chemotherapy for early stage breast cancer. <i>Fertil Steril</i> 2010;94: 638-644. | Study included in a recent systematic review (Freour <i>EJC</i> 2017) |
| Passildas, J., et al., Impact of Chemotherapy-induced Menopause in Women of Childbearing Age With Non-metastatic Breast Cancer - Preliminary Results From the MENO COR Study. <i>Clin Breast Cancer</i> , 2019, 19(1): p. e74-e84. | not relevant for the key question |
| Peng X, Zhi M, Wei M, Li TT, Zhang M, Zhang YQ, He H, Su M, Wang W, Chen JR et al. Thalidomide results in diminished ovarian reserve in reproductive age female IBD patients. <i>Medicine (Baltimore)</i> 2017;96: e6540. | Menstrual function, AMH, FSH and E2 in women with treated with thalidomide for inflammatory bowel disease |
| Perez-Fidalgo JA, Rosello S, Garcia-Garre E, Jorda E, Martin-Martorell P, Bermejo B, Chirivella I, Guzman C, Lluch A. Incidence of chemotherapy-induced amenorrhea in hormone-sensitive breast cancer patients: the impact of addition of taxanes to anthracycline-based regimens. <i>Breast Cancer Res Treat</i> 2010;120: 245-251. | Study included in a recent systematic review and meta-analysis (Silva <i>Hum Reprod</i> 2016 and Zhao <i>Breast Cancer Res Treat</i> 2014) |

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| Petrek JA, Naughton MJ, Case LD, Paskett ED, Naftalis EZ, Singletary SE, Sukumvanich P. Incidence, time course, and determinants of menstrual bleeding after breast cancer treatment: a prospective study. <i>J Clin Oncol</i> 2006;24: 1045-1051. | Updated studies and available metanalysis on the topic |
| Pinelli, S. and S. Basile, Fertility Preservation: Current and Future Perspectives for Oncologic Patients at Risk for Iatrogenic Premature Ovarian Insufficiency. <i>Biomed Res Int</i> , 2018. 2018: p. 6465903. | not relevant for the key question |
| Raciborska A, Bilka K, Filipp E, Drabko K, Rogowska E, Chaber R, Pogorzala M, Polczynska K, Adrianowska N, Rodriguez-Galindo C et al. Ovarian function in female survivors after multimodal Ewing sarcoma therapy. <i>Pediatr Blood Cancer</i> 2015;62: 341-345. | Study on childhood cancer; study included in the systematic review by Overbeek (<i>Cancer Treat Rev</i> 2017) |
| Randall TC, Kurman RJ. Progesterin treatment of atypical hyperplasia and well-differentiated carcinoma of the endometrium in women under age 40. <i>Obstet Gynecol</i> 1997;90: 434-440. | Relevant outcomes not assessed (article focused on fertility sparing treatment for endometrial cancer) |
| Recchia F, Candeloro G, Rosselli M, Bratta M, Pasta V, D'Orazi V, Fumagalli LA, Rea S. Adjuvant Ovarian Suppression, High-dose Chemotherapy and Immunotherapy for Premenopausal Patients with High-risk Breast Cancer. <i>Anticancer Res</i> 2015;35: 6847-6853. | Investigation of the gonadotoxicity of chemotherapy regimens not used in breast cancer |
| Rivkin S, Green S, Lew D, Costanzi J, Athens J, Osborne C, Vaughn C, Martino S. Adjuvant chemotherapy with cyclophosphamide, methotrexate, and 5-fluorouracil, vincristine, and prednisone compared with single-agent L-phenylalanine mustard for patients with operable breast carcinoma and positive axillary lymph nodes: 20-year results of a Southwest Oncology Group study. <i>Cancer</i> 2003;97: 21-29. | Relevant outcomes not assessed (treatment effect by menopausal status, not risk of POI with the different treatments) |
| Rodriguez-Wallberg KA. Principles of cancer treatment: impact on reproduction. <i>Adv Exp Med Biol</i> 2012;732: 1-8. | Narrative review (more updated data available in more recent reviews) |
| Roeca, C., S. Dovey, and A.J. Polotsky, Recommendations for assessing ovarian health and fertility potential in survivors of childhood cancer. <i>Maturitas</i> , 2019. 122: p. 57-59. | Childhood Cancer |
| Rosario PW, Fagundes TA, Fagundes AV, Barraso AL, Rezende LL, Padrao EL, Guimaraes VC, Purisch S. Radioiodine therapy and age at menopause in patients with thyroid cancer. <i>Clin Endocrinol (Oxf)</i> 2006;64: 225-226. | Topic already covered in the more updated paper by Clement 2015 |
| Rosendahl M, Ahlgren J, Andersen J, Bergh J, Blomquist C, Lidbrink E, Lindman H, Mouridsen H, Bjerre K, Andersson M. The risk of amenorrhoea after adjuvant chemotherapy for early stage breast cancer is related to inter-individual variations in chemotherapy-induced leukocyte nadir in young patients: data from the randomised SBG 2000-1 study. <i>Eur J Cancer</i> 2009;45: 3198-3204. | Updated studies and available metanalysis on the topic |
| Ruddy KJ, O'Neill A, Miller KD, Schneider BP, Baker E, Sparano JA, Dang C, Northfelt DW, Sledge GW, Jr., Partridge AH. Biomarker prediction of chemotherapy-related amenorrhea in premenopausal women with breast cancer participating in E5103. <i>Breast Cancer Res Treat</i> 2014;144: 591-597. | Study included in a recent systematic review (Freour <i>EJC</i> 2017) |
| Sakurai K, Enomoto K, Amano S. Recovery of menstruation after long-term chemotherapy and endocrine therapy in pre-menopausal patients with breast cancer. <i>J Cancer Res Clin Oncol</i> 2011;137: 615-620. | Larger studies on the topic |
| Salama M, Woodruff TK. Anticancer treatments and female fertility: clinical concerns and role of oncologists in oncofertility practice. <i>Expert Rev Anticancer Ther</i> 2017;17: 687-692. | Narrative review (more updated data available in more recent reviews) |
| Sawka AM, Lakra DC, Lea J, Alshehri B, Tsang RW, Briertley JD, Straus S, Thabane L, Gafni A, Ezzat S et al. A systematic review examining the effects of therapeutic radioactive iodine on ovarian function and future pregnancy in female thyroid cancer survivors. <i>Clin Endocrinol (Oxf)</i> 2008;69: 479-490. | Narrative review covered in the more updated paper by Clement 2015 |
| Schover LR, van der Kaaij M, van Dorst E, Creutzberg C, Huyghe E, Kiserud CE. Sexual dysfunction and infertility as late effects of cancer treatment. <i>EJC Suppl</i> 2014;12: 41-53. | Narrative review focused on sexual dysfunction more than ovarian function or fertility issues |
| Schover LR. Sexuality and fertility after cancer. <i>Hematology Am Soc Hematol Educ Program</i> 2005: 523-527. | Narrative review (more updated data available in more recent reviews) |
| Schuck A, Hamelmann V, Bramswig JH, Konemann S, Rube C, Hesselmann S, Riesenbeck D, Horst E, Bolling T, Paulussen M et al. Ovarian function following pelvic irradiation in prepubertal and pubertal girls and young adult women. <i>Strahlenther Onkol</i> 2005;181: 534-539. | Study that included mostly childhood cancer patients |
| Seshadri T, Hourigan MJ, Wolf M, Mollee PN, Seymour JF. The effect of the Hyper-CVAD chemotherapy regimen on fertility and ovarian function. <i>Leuk Res</i> 2006;30: 483-485. | Small study including only 7 evaluable patients |
| Silva, C., et al., Adverse reproductive health outcomes in a cohort of young women with breast cancer exposed to systemic treatments. <i>J Ovarian Res</i> , 2019. 12(1): p. 102. | obstetric outcomes |
| Singh G, Misra R, Aggarwal A. Ovarian Insufficiency is Major Short-term Toxicity in Systemic Lupus Erythematosus Patients Treated with Cyclophosphamide. <i>J Assoc Physicians India</i> 2016;64: 28-31. | Larger studies available on the topic |
| Sklar C. Maintenance of ovarian function and risk of premature menopause related to cancer treatment. <i>J Natl Cancer Inst Monogr</i> 2005: 25-27. | Narrative review (more updated data available in more recent reviews) |
| Socie G, Salooja N, Cohen A, Rovelli A, Carreras E, Locasciulli A, Korthof E, Weis J, Levy V, Tichelli A. Nonmalignant late effects after allogeneic stem cell transplantation. <i>Blood</i> 2003;101: 3373-3385. | Narrative review (more updated data available in more recent reviews) |
| Somigliana, E., et al., Chemotherapy-related damage to ovarian reserve in childhood cancer survivors: interpreting the evidence. <i>J Assist Reprod Genet</i> , 2019. 36(2): p. 341-348. | Childhood Cancer |
| Song G, Gao H, Yuan Z. Effect of leuprolide acetate on ovarian function after cyclophosphamide-doxorubicin-based chemotherapy in premenopausal patients with breast cancer: results from a phase II randomized trial. <i>Med Oncol</i> 2013;30: 667. | Study included in a recent systematic review and metanalysis (Silva <i>Hum Reprod</i> |

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| | 2016); to be included for the GnRHa question |
| Sparagana S, Franz DN, Krueger DA, Bissler JJ, Berkowitz N, Burock K, Kingswood JC. Pooled analysis of menstrual irregularities from three major clinical studies evaluating everolimus for the treatment of tuberous sclerosis complex. <i>PLoS One</i> 2017;12: e0186235. | Main outcome is menstrual irregularity (reported outcomes: LH level, delayed menstruation, oligomenorrhea, increased blood testosterone, polycystic ovaries, age of menarche) |
| Stearns V, Schneider B, Henry NL, Hayes DF, Flockhart DA. Breast cancer treatment and ovarian failure: risk factors and emerging genetic determinants. <i>Nat Rev Cancer</i> 2006;6: 886-893. | Narrative review (more updated original data available) |
| Stroud JS, Mutch D, Rader J, Powell M, Thaker PH, Grigsby PW. Effects of cancer treatment on ovarian function. <i>Fertil Steril</i> 2009;92: 417-427. | Narrative review (more updated data available in more recent reviews; radiotherapy covered more extensively in review by Wo Int J Rad 2009) |
| Su HI, Sammel MD, Green J, Velders L, Stankiewicz C, Matro J, Freeman EW, Gracia CR, DeMichele A. Antimullerian hormone and inhibin B are hormone measures of ovarian function in late reproductive-aged breast cancer survivors. <i>Cancer</i> 2010;116: 592-599. | Relevant outcomes not assessed (AMH levels assessed in patients already exposed to chemotherapy, not prior to chemotherapy) |
| Swain S, Land S, Ritter M, Costantino J, Cecchini R, Mamounas E, Wolmark N, Ganz P. Amenorrhea in premenopausal women on the doxorubicin-and-cyclophosphamide-followed-by-docetaxel arm of NSABP B-30 trial. <i>Breast cancer research and treatment</i> 2009;113: 315-320. | Study included in a systematic review and metaanalysis (Zhao Breast Cancer Res Treat 2014) |
| Swerdlow AJ, Cooke R, Bates A, Cunningham D, Falk SJ, Gilson D, Hancock BW, Harris SJ, Horwich A, Hoskin PJ et al. Risk of premature menopause after treatment for Hodgkin's lymphoma. <i>J Natl Cancer Inst</i> 2014;106. | Study included in the systematic review by Overbeek (Cancer Treat Rev 2017) |
| Tanaka T, Utsunomiya T, Utsunomiya H, Umesaki N. Irinotecan HCl, an anticancer topoisomerase I inhibitor, frequently induces ovarian failure in premenopausal and perimenopausal women. <i>Oncol Rep</i> 2008;19: 1123-1133. | Small study including only 32 evaluable patients (with different diseases and different chemotherapy agents) |
| Tiong V, Rozita AM, Taib NA, Yip CH, Ng CH. Incidence of chemotherapy-induced ovarian failure in premenopausal women undergoing chemotherapy for breast cancer. <i>World J Surg</i> 2014;38: 2288-2296. | Updated and larger studies on the topic |
| Tomao F, Miele E, Spinelli GP, Tomao S. Anticancer treatment and fertility effects. <i>Literature review. J Exp Clin Cancer Res</i> 2006;25: 475-481. | Narrative review (more updated data available in more recent reviews) |
| Torino F, Barnabei A, De Vecchis L, Appetecchia M, Strigari L, Corsello SM. Recognizing menopause in women with amenorrhea induced by cytotoxic chemotherapy for endocrine-responsive early breast cancer. <i>Endocr Relat Cancer</i> 2012;19: R21-33. | Narrative review (more updated data available in more recent reviews) |
| Torino F, Barnabei A, De Vecchis L, Sini V, Schittulli F, Marchetti P, Corsello SM. Chemotherapy-induced ovarian toxicity in patients affected by endocrine-responsive early breast cancer. <i>Crit Rev Oncol Hematol</i> 2014;89: 27-42. | Narrative review (more updated data available in more recent reviews) |
| Urbano MT, Tait DM. Can the irradiated uterus sustain a pregnancy? A literature review. <i>Clin Oncol (R Coll Radiol)</i> 2004;16: 24-28. | Narrative review (more updated data available in more recent reviews) |
| Utraiainen, P., et al., Gonadal Failure Is Common in Long-Term Survivors of Childhood High-Risk Neuroblastoma Treated With High-Dose Chemotherapy and Autologous Stem Cell Rescue. <i>Front Endocrinol (Lausanne)</i> . 2019. 10: p. 555. | Childhood Cancer |
| van den Berg, M.H., et al., Long-term effects of childhood cancer treatment on hormonal and ultrasound markers of ovarian reserve. <i>Hum Reprod</i> . 2018. 33(8): p. 1474-1488. | Childhood Cancer |
| Van Le L, McCormack M. Enhancing Care of the Survivor of Gynecologic Cancer: Managing the Menopause and Radiation Toxicity. <i>Am Soc Clin Oncol Educ Book</i> 2016;35: e270-275. | Narrative review outside the topic of the current question (this review assessed the consequences and not the risk of POI) |
| van Londen GJ, Perera S, Vujevich K, Rastogi P, Lembersky B, Brufsky A, Vogel V, Greenspan SL. The impact of an aromatase inhibitor on body composition and gonadal hormone levels in women with breast cancer. <i>Breast Cancer Res Treat</i> 2011;125: 441-446. | Relevant outcomes not assessed (article addressing BMI under treatment with AI in postmenopausal patients) |
| Vassilakopoulou M, Boostandoost E, Papaxoinis G, de La Motte Rouge T, Khayat D, Psyrra A. Anticancer treatment and fertility: Effect of therapeutic modalities on reproductive system and functions. <i>Crit Rev Oncol Hematol</i> 2016;97: 328-334. | Narrative review (more updated data available in more recent reviews) |
| Vini L, Hyer S, Al-Saadi A, Pratt B, Harmer C. Prognosis for fertility and ovarian function after treatment with radiiodine for thyroid cancer. <i>Postgrad Med J</i> 2002;78: 92-93. | More recent data from several retrospective/prospective data on the topic in the article by Clement CTR 2015 |
| Vriens IJ, De Bie AJ, Aarts MJ, de Boer M, van Hellemond IE, Roijen JH, van Golde RJ, Voogd AC, Tjan-Heijnen VC. The correlation of age with chemotherapy-induced ovarian function failure in breast cancer patients. <i>Oncotarget</i> 2017;8: 11372-11379. | Larger studies available on the topic |
| Vyfhuis, M.A.L., et al., Preserving Endocrine Function in Premenopausal Women Undergoing Whole Pelvis Radiation for Cervical Cancer. <i>Int J Part Ther</i> . 2019. 6(1): p. 10-17. | fertility protection |
| Wang PH, Chao HT, Chao KC. Chemotherapy-induced gonadotoxicity. <i>Taiwan J Obstet Gynecol</i> 2010;49: 1-2. | Editorial on an article addressing a case report on this topic |

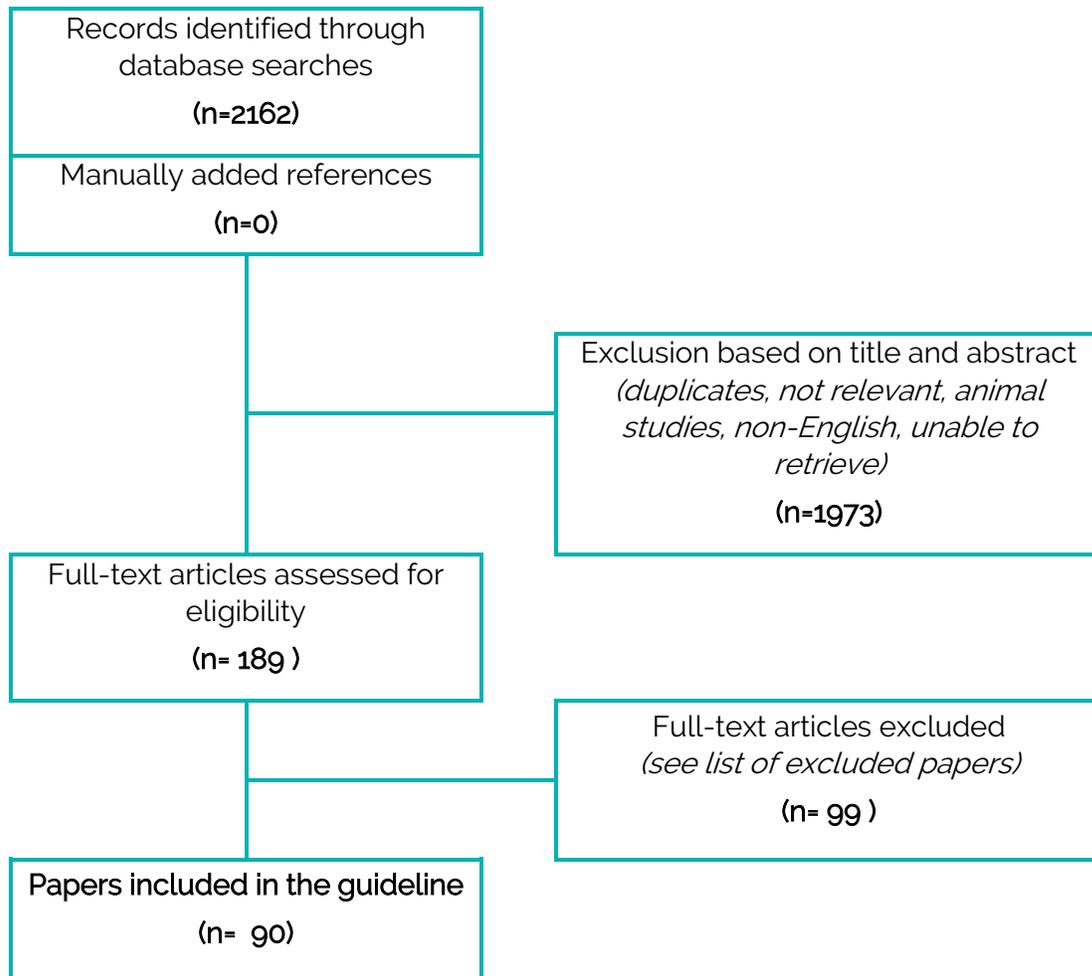
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| Wei, C. and E. Crowne, The impact of childhood cancer and its treatment on puberty and subsequent hypothalamic pituitary and gonadal function, in both boys and girls. <i>Best Pract Res Clin Endocrinol Metab</i> , 2019. 33(3): p. 101291. | Childhood Cancer |
| Wikstrom AM, Hovi L, Dunkel L, Saarinen-Pihkala UM. Restoration of ovarian function after chemotherapy for osteosarcoma. <i>Arch Dis Child</i> 2003;88: 428-431. | Study on childhood cancer; study included in the systematic review by Overbeek (<i>Cancer Treat Rev</i> 2017) |
| Williams D, Crofton PM, Levitt G. Does ifosfamide affect gonadal function? <i>Pediatr Blood Cancer</i> 2008;50: 347-351. | Study including mostly children, very small number of females |
| Wong L, Harper L, Little MA. Getting the balance right: adverse events of therapy in anti-neutrophil cytoplasm antibody vasculitis. <i>Nephrol Dial Transplant</i> 2015;30 Suppl 1: i164-170. | Narrative review (only the impact of cyclophosphamide on fertility is discussed but this is information already widely covered by other studies) |
| Wong, Q.H.Y. and R.A. Anderson, The role of antimullerian hormone in assessing ovarian damage from chemotherapy, radiotherapy and surgery. <i>Curr Opin Endocrinol Diabetes Obes</i> , 2018. 25(6): p. 391-398. | AMH |
| Xue, C., et al., Pretreatment anti-Mullerian hormone-based nomogram predicts menstruation status after chemotherapy for premenopausal women with hormone receptor-positive early breast cancer. <i>Breast Cancer Res Treat</i> , 2019. 173(3): p. 619-628. | AMH |
| Zhang, B., et al., Evaluation of menopausal status among breast cancer patients with chemotherapy-induced amenorrhea. <i>Chin J Cancer Res</i> , 2018. 30(4): p. 468-476. | detection |
| Zhou Q, Yin W, Du Y, Shen Z, Lu J. Prognostic impact of chemotherapy-induced amenorrhea on premenopausal breast cancer: a meta-analysis of the literature. <i>Menopause</i> 2015;22: 1091-1097. | Systematic review and metanalysis outside the topic of the current question (this article assessed the prognostic effect and not the risk of amenorrhea in breast cancer) |
| Zhou W, Ding Q, Liang X, He Z, Zha X, Liu X, Wang S. The risk of amenorrhea is related to chemotherapy-induced leucopenia in breast cancer patients receiving epirubicin and taxane based chemotherapy. <i>PLoS One</i> 2012;7: e37249. | Study included in the systematic review and metanalysis by Zhao (<i>Breast Cancer Res Treat</i> 2014) |

Q8. Is it relevant to do ovarian reserve testing, and for whom?

Search strings

| DATABASE | Search string |
|----------------------|--|
| PUBMED - CANCER | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Ovarian Reserve"[Mesh] OR "Ovarian Reserve" OR "AMH" OR "anti-Mullerian hormone" OR "antral follicle count" OR "AFC" OR "ovarian function" OR "ovarian aging") |
| PUBMED - CANCER 2 | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) AND ("Ovarian Reserve"[Mesh] OR "Ovarian Reserve" OR "AMH" OR "anti-Mullerian hormone" OR "antral follicle count" OR "AFC" OR "ovarian function" OR "ovarian aging") REVIEWS ONLY |
| PUBMED - MERGED | ("Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis" OR "Transgender Persons"[Mesh] OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Ovarian Reserve"[Mesh] OR "Ovarian Reserve" OR "AMH" OR "anti-Mullerian hormone" OR "antral follicle count" OR "AFC" OR "ovarian function" OR "ovarian aging") |
| COCHRANE - merged | (Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis" OR "Transgender Persons" OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation") AND ("Ovarian Reserve" OR "AMH" OR "anti-Mullerian hormone" OR "antral follicle count" OR "AFC" OR "ovarian function" OR "ovarian aging") |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|--|--|
| Abu-Musa AA, Usta IM, Azar S, Salti I, Nassar AH. Ovarian reserve in patients with autoimmune diseases. <i>Eur J Obstet Gynecol Reprod Biol</i> 2006;126: 273-274. | Letter to the editor |
| Aikawa NE, Sallum AM, Pereira RM, Suzuki L, Viana VS, Bonfa E, Silva CA. Subclinical impairment of ovarian reserve in juvenile systemic lupus erythematosus after cyclophosphamide therapy. <i>Clin Exp Rheumatol</i> 2012;30: 445-449. | Study in children/childhood disease |
| Almog B, Shehata F, Sheizaf B, Tan SL, Tulandi T. Effects of ovarian endometrioma on the number of oocytes retrieved for in vitro fertilization. <i>Fertil Steril</i> 2011;95: 525-527. | Included in review Seyhan2015 |
| Ata B, Mumusoglu S, Aslan K, Seyhan A, Kasapoglu I, Avci B, Urman B, Bozdag G, Uncu G. Which is worse? Comparison of ART outcome between women with primary or recurrent endometriomas. <i>Hum Reprod</i> 2017;32: 1427-1431. | No relevant outcomes measured |
| Avraham S, Almog B, Reches A, Zakar L, Malcov M, Sokolov A, Alpern S, Azem F. The ovarian response in fragile X patients and premutation carriers undergoing IVF-PGD: reappraisal. <i>Hum Reprod</i> 2017;32: 1508-1511. | No relevant testing nor outcomes studied |
| Badik JR, Castaneda U, Gleason TJ, Spencer JB, Epstein MP, Ficicoglu C, Fitzgerald K, Fridovich-Keil JL. Ovarian function in Duarte galactosemia. <i>Fertil Steril</i> 2011;96: 469-473.e461. | Not relevant for the key question |
| Bajoria R, Chatterjee R. Hypogonadotrophic hypogonadism and diminished gonadal reserve accounts for dysfunctional gametogenesis in thalassaemia patients with iron overload presenting with infertility. <i>Hemoglobin</i> 2011;35: 636-642. | Not relevant for the key question |
| Bedoschi G, Navarro PA, Oktay K. Chemotherapy-induced damage to ovary: mechanisms and clinical impact. <i>Future Oncol</i> 2016;12: 2333-2344. | Some papers have already been included in other reviews |
| Behringer K, Mueller H, Goergen H, Thielen I, Eibl AD, Stumpf V, Wessels C, Wiehlputz M, Rosenbrock J, Halbsguth T et al. Gonadal function and fertility in survivors after Hodgkin lymphoma treatment within the German Hodgkin Study Group HD13 to HD15 trials. <i>J Clin Oncol</i> 2013;31: 231-239. | effect of "diseases" on ovarian reserve |
| Beneventi F, Locatelli E, Giorgiani G, Zecca M, Locatelli F, Cavagnoli C, Simonetta M, Bariselli S, Negri B, Spinillo A. Gonadal and uterine function in female survivors treated by chemotherapy, radiotherapy, and/or bone marrow transplantation for childhood malignant and non-malignant diseases. <i>Bjog</i> 2014;121: 856-865; discussion 865. | ovarian function was before treatment was not determined, therefore not possible to correlate outcome to treatment |
| Bi X, Zhang J, Cao D, Sun H, Feng F, Wan X, Xiang Y, Qiu L, Cheng X, Yang J et al. Anti-Mullerian hormone levels in patients with gestational trophoblastic neoplasia treated with different chemotherapy regimens: a prospective cohort study. <i>Oncotarget</i> 2017;8: 113920-113927. | Not relevant for the key question |
| Birch Petersen K, Hvidman HW, Sylvest R, Pinborg A, Larsen EC, Macklon KT, Andersen AN, Schmidt L. Family intentions and personal considerations on postponing childbearing in childless cohabiting and single women aged 35-43 seeking fertility assessment and counselling. <i>Hum Reprod</i> 2015;30: 2563-2574. | No relevant intervention, no relevant outcomes |
| Browne H, McCarthy-Keith D, Stegmann B, Spies J, Armstrong A. Ovarian response in women undergoing ovarian stimulation after myomectomy. <i>Fertil Steril</i> 2008;90: 2004.e2019-2021. | case report |
| Brunner HI, Bishnoi A, Barron AC, Houk LJ, Ware A, Farhey Y, Mongey AB, Strife CF, Graham TB, Passo MH. Disease outcomes and ovarian function of childhood-onset systemic lupus erythematosus. <i>Lupus</i> 2006;15: 198-206. | Included in review Oktem 2016 |
| Check JH. What role does decreased ovarian reserve play in the aetiology of infertility related to endometriosis? <i>Hum Reprod</i> 2003;18: 653-654; author reply 654-655. | Newer reviews available |
| Chemaitilly W, Mertens AC, Mitby P, Whitton J, Stovall M, Yasui Y, Robison LL, Sklar CA. Acute ovarian failure in the childhood cancer survivor study. <i>J Clin Endocrinol Metab</i> 2006;91: 1723-1728. | Study in children/childhood disease |
| Chighizola CB, Raimondo MG, Meroni PL. Does APS Impact Women's Fertility? <i>Curr Rheumatol Rep</i> 2017;19: 33. | Not relevant for the key question |
| Cil AP, Leventoglu A, Sonmezer M, Soylukoc R, Oktay K. Assessment of ovarian reserve and Doppler characteristics in patients with multiple sclerosis using immunomodulating drugs. <i>J Turk Ger Gynecol Assoc</i> 2009;10: 213-219. | No relevant outcomes included |
| Cil AP, Turkgeldi L, Seli E. Oocyte Cryopreservation as a Preventive Measure for Age-Related Fertility Loss. <i>Semin Reprod Med</i> 2015;33: 429-435. | No relevant testing nor outcomes |
| Clark CA, Laskin CA. Ovarian reserve in antiphospholipid syndrome: the jury is still out. <i>Lupus</i> 2015;24: 773. | Letter to the editor |
| de la Noval BD. Potential implications on female fertility and reproductive lifespan in BRCA germline mutation women. <i>Arch Gynecol Obstet</i> 2016;294: 1099-1103. | effect of "diseases" on ovarian reserve |
| Decanter C, Morschhauser F, Pigny P, Lefebvre C, Gallo C, Dewailly D. Anti-Mullerian hormone follow-up in young women treated by chemotherapy for lymphoma: preliminary results. <i>Reprod Biomed Online</i> 2010;20: 280-285. | Included in review Dewailly |
| Di Paola R, Costantini C, Tecchio C, Salvagno GL, Montemezzi R, Perandini A, Pizzolo G, Zaffagnini S, Franchi M. Anti-Mullerian hormone and antral follicle count reveal a late impairment of ovarian reserve in patients undergoing low-gonadotoxic regimens for hematological malignancies. <i>Oncologist</i> 2013;18: 1307-1314. | included for question on gonadotoxicity |
| El Issaoui M, Giorgione V, Mamsen LS, Rechnitzer C, Birkebaek N, Clausen N, Kelsey TW, Andersen CV. Effect of first line cancer treatment on the ovarian reserve and follicular density in girls under the age of 18 years. <i>Fertil Steril</i> 2016;106: 1757-1762.e1751. | Retrospective data, Low number patients |
| Esinler I, Bozdag G, Arkan I, Demir B, Yerali H. Endometrioma \leq 3 cm in diameter per se does not affect ovarian reserve in intracytoplasmic sperm injection cycles. <i>Gynecol Obstet Invest</i> 2012;74: 261-264. | Included in review Somigliana 2015 |
| Filippi F, Benaglia L, Paffoni A, Restelli L, Vercellini P, Somigliana E, Fedele L. Ovarian endometriomas and oocyte quality: insights from in vitro fertilization cycles. <i>Fertil Steril</i> 2014;101: 988-993.e981. | Included in review Somigliana 2015 |

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| Flaisler F, Hedon B, Sany J, Combe B. A study of ovarian function in rheumatoid arthritis. <i>Rev Rhum Engl Ed</i> 1995;62: 549-554. | full text not available |
| Freour T, Barriere P, Masson D. Anti-mullerian hormone levels and evolution in women of reproductive age with breast cancer treated with chemotherapy. <i>Eur J Cancer</i> 2017;74: 1-8. | review |
| Fridovich-Keil JL, Gubbels CS, Spencer JB, Sanders RD, Land JA, Rubio-Gozalbo E. Ovarian function in girls and women with GALT-deficiency galactosemia. <i>J Inherit Metab Dis</i> 2011;34: 357-366. | Not relevant for the key question |
| Fridovich-Keil JL, Sanders RD, Spencer JB, Epstein MP, Lustbader JW, Vardhana PA. Measures of ovarian function in galactosemia. <i>Fertil Steril</i> 2009;92: e30; author reply e31. | Not relevant for the key question |
| Gao H, Ma J, Wang X, Lv T, Liu J, Ren Y, Li Y, Zhang Y. Preliminary study on the changes of ovarian reserve, menstruation, and lymphocyte subpopulation in systemic lupus erythematosus (SLE) patients of childbearing age. <i>Lupus</i> 2018;27: 445-453. | Not relevant for the key question |
| Garrido N, Pellicer A, Remohi J, Simon C. Uterine and ovarian function in endometriosis. <i>Semin Reprod Med</i> 2003;21: 183-192. | Newer reviews available |
| Gasparin AA, Souza L, Siebert M, Xavier RM, Chakr RM, Palominos PE, Brenol JC, Monticelo OA. Assessment of anti-Mullerian hormone levels in premenopausal patients with systemic lupus erythematosus. <i>Lupus</i> 2016;25: 227-232. | Not relevant for the key question |
| Ghaleb RM, Fahmy KA. Anti-Mullerian hormone: a marker for ovarian function in systemic lupus erythematosus patients treated with cyclophosphamide. <i>Joint Bone Spine</i> 2013;80: 434-435. | Letter to the editor |
| Gizzo S, Vitagliano A, Noventa M, Litta P, Saccardi C, Quaranta M. Surgery, endometriosis-related infertility and negative impact on ovarian reserve: 'which came first, the hen or the egg?' An unresolved dilemma. <i>Arch Gynecol Obstet</i> 2015;292: 709-711. | editorial letter |
| Goldman RH, Racowsky C, Farland LV, Munne S, Ribustello L, Fox JH. Predicting the likelihood of live birth for elective oocyte cryopreservation: a counseling tool for physicians and patients. <i>Hum Reprod</i> 2017;32: 853-859. | No relevant testing nor outcomes |
| Grossman LC, Safier LZ, Kline MD, Chan CW, Lobo RA, Sauer MV, Douglas NC. Utility of Ovarian Reserve Screening with Anti-Mullerian Hormone for Reproductive Age Women Deferring Pregnancy. <i>J Womens Health (Larchmt)</i> 2017;26: 345-351. | No relevant testing nor outcomes |
| Gupta AA, Lee Chong A, Deveault C, Traubici J, Maloney AM, Knight S, Lorenzo A, Allen L. Anti-Mullerian Hormone in Female Adolescent Cancer Patients Before, During, and After Completion of Therapy: A Pilot Feasibility Study. <i>J Pediatr Adolesc Gynecol</i> 2016;29: 599-603. | Not relevant for the key question |
| Hipp H, Loucks TL, Nezhat C, Sidell N, Session DR. Anti-Mullerian Hormone in Peritoneal Fluid and Plasma From Women With and Without Endometriosis. <i>Reprod Sci</i> 2015;22: 1129-1133. | Not relevant for the key question |
| Hurley EG, Ressler IB, Young S, Batcheller A, Thomas MA, DiPaola KB, Rios J. Postponing Childbearing and Fertility Preservation in Young Professional Women. <i>South Med J</i> 2018;111: 187-191. | No. No OR testing, no relevant outcomes |
| Iwase A, Sugita A, Hirokawa W, Goto M, Nakahara T, Bayasula, Kajiyama H, Shibata K, Nagatomo Y, Kikkawa F. Anti-Mullerian hormone as a marker of ovarian reserve in patients with ovarian malignancies who have undergone fertility-preserving surgery and chemotherapy. <i>Gynecol Endocrinol</i> 2013;29: 357-360. | low number of patients |
| Jaillard S, Akloul L, Beaumont M, Hamdi-Roze H, Dubourg C, Odent S, Duros S, Dejuqc-Rainsford N, Belaud-Rotureau MA, Ravel C. Array-CGH diagnosis in ovarian failure: identification of new molecular actors for ovarian physiology. <i>J Ovarian Res</i> 2016;9: 63. | No relevant testing nor outcomes |
| Jones BP, Saso S, Mania A, Smith JR, Serhal P, Ben Nagi J. The dawn of a new ice age: social egg freezing. <i>Acta Obstet Gynecol Scand</i> 2018. | Not relevant intervention |
| Kim C, Karvonen-Gutierrez C, Kong S, Arends V, Steffes M, McConnell DS, Randolph JF, Jr., Harlow SD. Antimullerian hormone among women with and without type 1 diabetes: the Epidemiology of Diabetes Interventions and Complications Study and the Michigan Bone Health and Metabolism Study. <i>Fertil Steril</i> 2016;106: 1446-1452. | Included in review Wellons 2017 |
| Knauff EA, Richardus R, Eijkemans MJ, Broekmans FJ, de Jong FJ, Fauser BC, Bosch AM. Heterozygosity for the classical galactosemia mutation does not affect ovarian reserve and menopausal age. <i>Reprod Sci</i> 2007;14: 780-785. | Included in review Fridovich-Keil 2011 |
| Lebkowska A, Adamska A, Karczewska-Kupczewska M, Nikolajuk A, Oziomek E, Milewski R, Gorska M, Wolczynski S, Kowalska I. Serum anti-Mullerian hormone concentration in women with polycystic ovary syndrome and type 1 diabetes mellitus. <i>Metabolism</i> 2016;65: 804-811. | Not relevant for the key question |
| Lee S, Ozkavukcu S, Heytens E, Moy F, Alappat RM, Oktay K. Anti-Mullerian hormone and antral follicle count as predictors for embryo/oocyte cryopreservation cycle outcomes in breast cancer patients stimulated with letrozole and follicle stimulating hormone. <i>J Assist Reprod Genet</i> 2011;28: 651-656. | Not relevant for the key question |
| Levin I, Almog B. Effect of cancer on ovarian function in patients undergoing in vitro fertilization for fertility preservation: a reappraisal. <i>Curr Oncol</i> 2013;20: e1-3. | Not relevant for the key question |
| Lie Fong S, Lugtenburg PJ, Schipper I, Themmen AP, de Jong FH, Sonneveld P, Laven JS. Anti-mullerian hormone as a marker of ovarian function in women after chemotherapy and radiotherapy for haematological malignancies. <i>Hum Reprod</i> 2008;23: 674-678. | Included in review Peigne |
| Lin W, Titus S, Moy F, Ginsburg ES, Oktay K. Ovarian Aging in Women With BRCA Germline Mutations. <i>J Clin Endocrinol Metab</i> 2017;102: 3839-3847. | effect of "diseases" on ovarian reserve |
| Lunsford AJ, Whelan K, McCormick K, McLaren JF. Antimullerian hormone as a measure of reproductive function in female childhood cancer survivors. <i>Fertil Steril</i> 2014;101: 227-231. | Not relevant for the key question |
| Ma W, Zhan Z, Liang X, Chen J, Huang X, Liao C. Subclinical impairment of ovarian reserve in systemic lupus erythematosus patients with normal menstruation not using alkylating therapy. <i>J Womens Health (Larchmt)</i> 2013;22: 1023-1027. | Not relevant for the key question |
| Malheiro OB, Rezende CP, Rocha AL, Del Puerto HL, Ferreira GA, Reis FM. Regular menstrual cycles do not rule out ovarian damage in adult women with systemic lupus erythematosus. <i>Gynecol Endocrinol</i> 2014;30: 701-704. | low number of patients |
| Maltaris T, Seufert R, Fischl F, Schaffrath M, Pollow K, Koelbl H, Dittrich R. The effect of cancer treatment on female fertility and strategies for preserving fertility. <i>Eur J Obstet Gynecol Reprod Biol</i> 2007;130: 148-155. | papers have been included in previous reviews |

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| Man L, Lekovich J, Rosenwaks Z, Gerhardt J. Fragile X-Associated Diminished Ovarian Reserve and Primary Ovarian Insufficiency from Molecular Mechanisms to Clinical Manifestations. <i>Front Mol Neurosci</i> 2017;10: 290. | Not relevant for the key question |
| Martinez F. Update on fertility preservation from the Barcelona International Society for Fertility Preservation-ESHRE-ASRM 2015 expert meeting: indications, results and future perspectives. <i>Hum Reprod</i> 2017;32: 1802-1811. | Papers referred not too much in detail |
| Martins NFE, Seixas MI, Pereira JP, Costa MM, Fonseca JE. Anti-mullerian hormone and ovarian reserve in systemic lupus erythematosus. <i>Clin Rheumatol</i> 2017;36: 2853-2854. | Review from Oktem 2016 more complete |
| Meczekalski B, Czyzyk A, Kunicki M, Podfigurna-Stopa A, Plociennik L, Jakiel G, Maciejewska-Jeske M, Lukaszuk K. Fertility in women of late reproductive age: the role of serum anti-Mullerian hormone (AMH) levels in its assessment. <i>J Endocrinol Invest</i> 2016;39: 1259-1265. | Not relevant group of patients |
| Mohamed AA, Yosef AH, James C, Al-Hussaini TK, Bedaiwy MA, Amer S. Ovarian reserve after salpingectomy: a systematic review and meta-analysis. <i>Acta Obstet Gynecol Scand</i> 2017;96: 795-803. | Not relevant for the key question |
| Mok CC, Chan PT, To CH. Anti-mullerian hormone and ovarian reserve in systemic lupus erythematosus. <i>Arthritis Rheum</i> 2013;65: 206-210. | Included in review Oktem 2016 |
| Moreau J, Gatimel N, Cohade C, Parinaud J, Leandri R. Mother's age at menopause but not own age at menarche has an impact on ovarian reserve. <i>Gynecol Endocrinol</i> 2018: 1-2. | No. No relevant patient group |
| Moria A, Das M, Shehata F, Holzer H, Son WY, Tulandi T. Ovarian reserve and oocyte maturity in women with malignancy undergoing in vitro maturation treatment. <i>Fertil Steril</i> 2011;95: 1621-1623. | Not relevant for the key question |
| Munster PN. Fertility preservation and breast cancer: A complex problem. <i>Oncology (Williston Park)</i> 2013;27: 533-539. | effect of "diseases" on ovarian reserve |
| Oktay K, Moy F, Titus S, Stobezki R, Turan V, Dickler M, Goswami S. Age-related decline in DNA repair function explains diminished ovarian reserve, earlier menopause, and possible oocyte vulnerability to chemotherapy in women with BRCA mutations. <i>J Clin Oncol</i> 2014;32: 1093-1094. | Editor letter |
| Oktem O, Guzel Y, Aksoy S, Aydin E, Urman B. Ovarian function and reproductive outcomes of female patients with systemic lupus erythematosus and the strategies to preserve their fertility. <i>Obstet Gynecol Surv</i> 2015;70: 196-210. | New review available |
| Oktem O, Oktay K. Quantitative assessment of the impact of chemotherapy on ovarian follicle reserve and stromal function. <i>Cancer</i> 2007;110: 2222-2229. | Not relevant for the key question |
| Oral E, Demir B, Inceboz U. Endometriosis and ovarian reserve. <i>Womens Health (Lond)</i> 2015;11: 671-675. | Not relevant for the key question |
| Ottolina J, Mangili G, Sigismondi C, Vanni VS, Viganò P, Candiani M. Reproductive function assessment after surgery plus chemotherapy for germ cell ovarian tumors (MOGCT): novel clues deriving from the field of fertility preservation. <i>Gynecol Endocrinol</i> 2014;30: 778-780. | Case report of just four cases |
| Paradisi R, Vicenti R, Macciocca M, Seracchioli R, Rossi S, Fabbri R. High cytokine expression and reduced ovarian reserve in patients with Hodgkin lymphoma or non-Hodgkin lymphoma. <i>Fertil Steril</i> 2016;106: 1176-1182. | No relevant outcome studied |
| Pasoto SG. Ovarian reserve in systemic lupus erythematosus patients with normal menstrual cycles and in the absence of exposure to alkylating agents. <i>J Womens Health (Larchmt)</i> 2013;22: 1003-1004. | Editorial |
| Perdrix A, Saint-Ghislain M, Degremont M, David M, Khaznadar Z, Loeb A, Leheurteur M, Di Fiore F, Clatot F. Influence of adjuvant chemotherapy on anti-Mullerian hormone in women below 35 years treated for early breast cancer. <i>Reprod Biomed Online</i> 2017;35: 468-474. | Full text not available |
| Posadzka E, Jach R, Pitynski K, Nocun A. Ovarian reserve assessment in women with different stages of pelvic endometriosis. <i>Ginekol Pol</i> 2014;85: 446-450. | Low number patients |
| Pup LD, Zanet E, Rupolo M, Talamini R, Tirelli U, Mazzucato M, Steffan A, Zanussi S, Doretto P, Michieli M. Which tools may help physicians in female fertility prediction after autologous bone marrow transplantation for lymphoma? A pilot study. <i>J Chemother</i> 2014;26: 293-299. | Low number of patients |
| Quinn MM, Cakmak H, Letourneau JM, Cedars MI, Rosen MP. Response to ovarian stimulation is not impacted by a breast cancer diagnosis. <i>Hum Reprod</i> 2017;32: 568-574. | effect of "diseases" on ovarian reserve |
| Raciborska A, Biliska K, Filipp E, Drabko K, Rogowska E, Chaber R, Pogorzala M, Polczynska K, Adrianowska N, Rodriguez-Galindo C et al. Ovarian function in female survivors after multimodal Ewing sarcoma therapy. <i>Pediatr Blood Cancer</i> 2015;62: 341-345. | Retrospective study and low number of patients |
| Roness H, Gavish Z, Cohen Y, Meirou D. Ovarian follicle burnout: a universal phenomenon? <i>Cell Cycle</i> 2013;12: 3245-3246. | No relevant testing nor outcomes |
| Rossi BV, Missmer S, Correia KF, Wadleigh M, Ginsburg ES. Ovarian reserve in women treated for acute lymphocytic leukemia or acute myeloid leukemia with chemotherapy, but not stem cell transplantation. <i>ISRN Oncol</i> 2012;2012: 956190. | Small number of included patients |
| Schufreider A, McQueen DB, Lee SM, Allon R, Uhler ML, Davie J, Feinberg EC. Diminished ovarian reserve is not observed in infertility patients with high normal CGG repeats on the fragile X mental retardation 1 (FMR1) gene. <i>Hum Reprod</i> 2015;30: 2686-2692. | Not relevant group of patients |
| Senapati S, Sammel MD, Morse C, Barnhart KT. Impact of endometriosis on in vitro fertilization outcomes: an evaluation of the Society for Assisted Reproductive Technologies Database. <i>Fertil Steril</i> 2016;106: 164-171.e161. | No relevant testing nor outcomes |
| Seyhan A, Ata B, Uncu G. The Impact of Endometriosis and Its Treatment on Ovarian Reserve. <i>Semin Reprod Med</i> 2015;33: 422-428. | Not relevant for the key question |
| Shapira M, Raanani H, Feldman B, Srebnik N, Dereck-Haim S, Manela D, Brenghausen M, Geva-Lerner L, Friedman E, Levi-Lahad E et al. BRCA mutation carriers show normal ovarian response in in vitro fertilization cycles. <i>Fertil Steril</i> 2015;104: 1162-1167. | No relevant testing nor outcomes |
| Shebl O, Ebner T, Sommergruber M, Sir A, Tews G. Anti muellerian hormone serum levels in women with endometriosis: a case-control study. <i>Gynecol Endocrinol</i> 2009;25: 713-716. | Included in review Seyhan2015 |
| Somigliana E, Marchese MA, Frattaruolo MP, Berlanda N, Fedele L, Vercellini P. Serum anti-mullerian hormone in reproductive aged women with benign ovarian cysts. <i>Eur J Obstet Gynecol Reprod Biol</i> 2014;180: 142-147. | Included in review of Somigliana 2015 |

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| Somigliana E, Vigano P, Filippi F, Papaleo E, Benaglia L, Candiani M, Vercellini P. Fertility preservation in women with endometriosis: for all, for some, for none? <i>Hum Reprod</i> 2015;30: 1280-1286. | Not relevant for the key question |
| Sonigo C, Comtet M, Duros S, Sifer C, Sermondade N, Grynberg M. Antral follicle responsiveness to FSH, assessed by the follicular output rate (FORT), is altered in Hodgkin's lymphoma when compared with breast cancer candidates for fertility preservation. <i>J Assist Reprod Genet</i> 2018;35: 91-97. | effect of "diseases" on ovarian reserve |
| Soto N, Iniguez G, Lopez P, Larenas G, Mujica V, Rey RA, Codner E. Anti-Mullerian hormone and inhibin B levels as markers of premature ovarian aging and transition to menopause in type 1 diabetes mellitus. <i>Hum Reprod</i> 2009;24: 2838-2844. | Included in review Wellons 2017 |
| Spencer JB, Badik JR, Ryan EL, Gleason TJ, Broadaway KA, Epstein MP, Fridovich-Keil JL. Modifiers of ovarian function in girls and women with classic galactosemia. <i>J Clin Endocrinol Metab</i> 2013;98: E1257-1265. | Not relevant for the key question |
| Su HJ. Measuring ovarian function in young cancer survivors. <i>Minerva Endocrinol</i> 2010;35: 259-270. | Newer reviews available (Freour 2017) |
| Subrat P, Santa SA, Vandana J. The Concepts and Consequences of Early Ovarian Ageing: A Caveat to Women's Health. <i>J Reprod Infertil</i> 2013;14: 3-7. | Not much detail on studies |
| Takae S, Sugishita Y, Yoshioka N, Hoshina M, Horage Y, Sato Y, Nishijima C, Kawamura K, Suzuki N. The role of menstrual cycle phase and AMH levels in breast cancer patients whose ovarian tissue was cryopreserved for oncofertility treatment. <i>J Assist Reprod Genet</i> 2015;32: 305-312. | Retrospective, small number patients |
| Timberlake KS, Foley KL, Hurst BS, Matthews ML, Usadi RS, Marshburn PB. Association of blood type and patient characteristics with ovarian reserve. <i>Fertil Steril</i> 2013;100: 1735-1739. | No relevant patient group |
| Tomao F, Spinelli GP, Panici PB, Frati L, Tomao S. Ovarian function, reproduction and strategies for fertility preservation after breast cancer. <i>Crit Rev Oncol Hematol</i> 2010;76: 1-12. | Other new reviews are available |
| Ulug P, Oner G, Kasap B, Akbas EM, Ozcicek F. Evaluation of ovarian reserve tests in women with systemic lupus erythematosus. <i>Am J Reprod Immunol</i> 2014;72: 85-88. | Not relevant for the key question |
| Vatanen A, Wilhelmsson M, Borgstrom B, Gustafsson B, Taskinen M, Saarinen-Pihkala UM, Winiarski J, Jahnukainen K. Ovarian function after allogeneic hematopoietic stem cell transplantation in childhood and adolescence. <i>Eur J Endocrinol</i> 2014;170: 211-218. | Retrospective, condition: Stem cell transplantation |
| Velarde-Ochoa Mdel C, Esquivel-Valerio JA, Vega-Morales D, Skinner-Taylor CM, Galarza-Delgado DA, Garza-Elizondo MA. Anti-Mullerian hormone in reproductive age women with systemic lupus erythematosus. <i>Reumatol Clin</i> 2015;11: 78-82. | low quality, local journal, no details on exact inclusion criteria, materials and methods. |
| Visser JA, Hokken-Koelega AC, Zandwijken GR, Limacher A, Ranke MB, Fluck CE. Anti-Mullerian hormone levels in girls and adolescents with Turner syndrome are related to karyotype, pubertal development and growth hormone treatment. <i>Hum Reprod</i> 2013;28: 1899-1907. | No relevant outcomes included |
| Wenners A, Grambach J, Koss J, Maass N, Jonat W, Schmutzler A, Mundhenke C. Reduced ovarian reserve in young early breast cancer patients: preliminary data from a prospective cohort trial. <i>BMC Cancer</i> 2017;17: 632. | Some subgroups had low number patients |
| Yamakami LY, Serafini PC, de Araujo DB, Bonfa E, Leon EP, Baracat EC, Silva CA, Clark CA, Laskin CA. Ovarian reserve in antiphospholipid syndrome: the jury is still out. <i>Lupus</i> 2015; 24: 773. <i>Lupus</i> 2015;24: 1007. | Letter to the editor |
| Zolton JR, Parikh TP, Hickstein DD, Holland SM, Hill MJ, DeCherney AH, Wolff EF. Oocyte cryopreservation for women with GATA2 deficiency. <i>J Assist Reprod Genet</i> 2018. | LOW - Retrospective, low numbers |

Q9 Which options are available for FP in females – emergency and non-emergency?

This question was answered as a narrative question. There was no literature search performed.

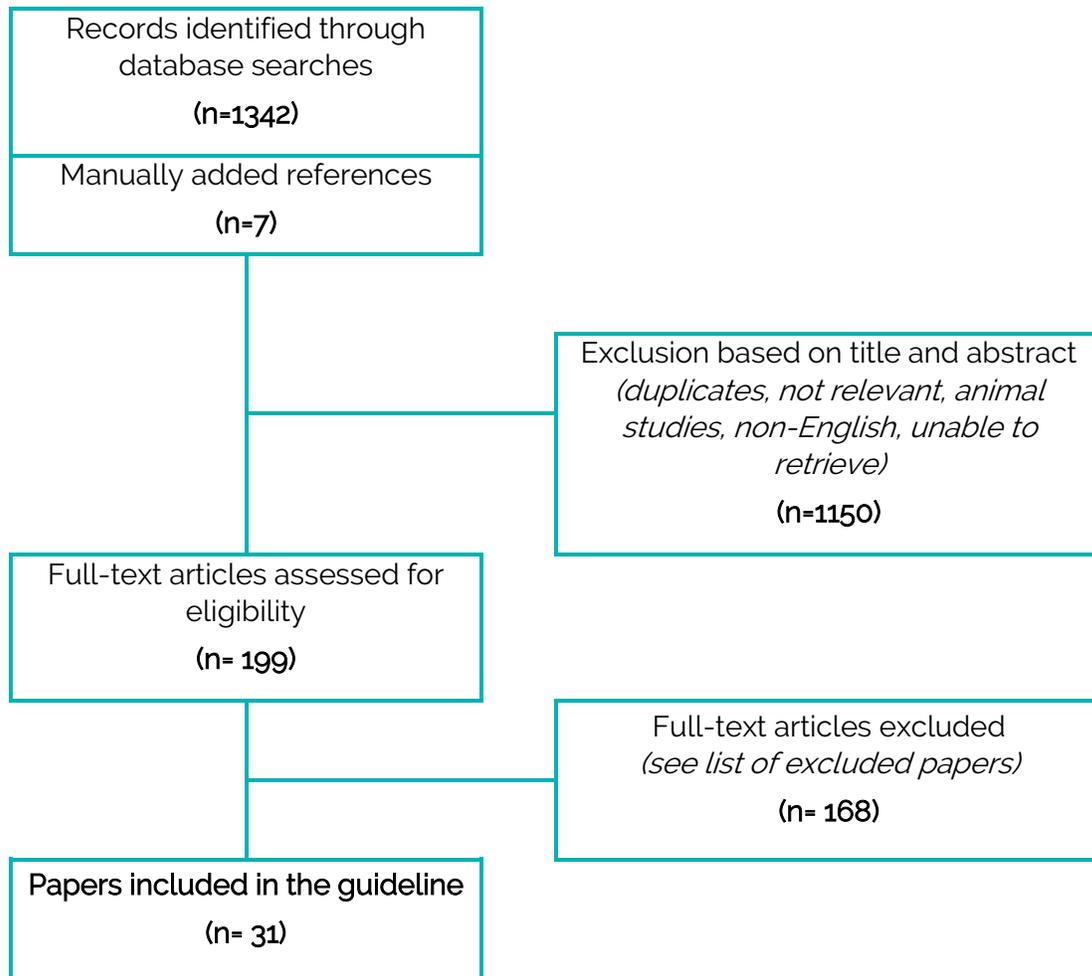
The information used to answer this question was derived from the papers selected for other questions in this guideline. In addition, the text was based on the expert opinion of the GDG members.

Q10 Is oocyte cryopreservation effective and safe for fertility preservation?

Search strings

| DATABASE | Search string |
|-------------------|--|
| MERGE PUBMED | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassaemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis" OR "Transgender Persons"[Mesh] OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Oocyte cryopreservation" OR "Oocyte freezing" OR "Egg cryopreservation" OR "Egg freezing" OR "oocyte banking" OR "Oocyte vitrification" OR "egg vitrification" OR ("Cryopreservation"[Mesh] OR "Cryopreservation") AND (oocyte OR egg)) |
| MERGE COCHRANE | (Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis" OR "Transgender Persons" OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation") AND ("Oocyte cryopreservation" OR "Oocyte freezing" OR "Egg cryopreservation" OR "Egg freezing" OR "oocyte banking" OR "Oocyte vitrification" OR "egg vitrification") |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|---|--|
| Abdallah Y, Briggs J, Jones J, Horne G, Fitzgerald C. A nationwide UK survey of female fertility preservation prior to cancer treatment. <i>Human fertility (Cambridge, England)</i> 2018;21: 27-34. | INCONSISTENCY IN REPORT OF ACTIVITIES |
| Abir R, Fisch B, Nahum R, Orvieto R, Nitke S, Ben Rafael Z. Turner's syndrome and fertility: current status and possible putative prospects. <i>Human reproduction update</i> 2001;7: 603-610. | REVIEW |
| Albani E, Barbieri J, Novara PV, Smeraldi A, Scaravelli G, Levi Setti PE. Oocyte cryopreservation. <i>Placenta</i> 2008;29 Suppl B: 143-146. | LARGE NUMBER OF CASES BUT SLOW FREEZING |
| Albertini DF, Olsen R. Effects of fertility preservation on oocyte genomic integrity. <i>Advances in experimental medicine and biology</i> 2013;761: 19-27. | TECHNICAL REVIEW |
| Anderson RA, Wallace WH. Fertility preservation in girls and young women. <i>Clinical endocrinology</i> 2011;75: 409-419. | EXPERT OPINION |
| Argyle CE, Harper JC, Davies MC. Oocyte cryopreservation: where are we now? <i>Human reproduction update</i> 2016;22: 440-449. | REVIEW UPDATE 2015 |
| Bagchi A, Woods EJ, Critser JK. Cryopreservation and vitrification: recent advances in fertility preservation technologies. <i>Expert review of medical devices</i> 2008;5: 359-370. | REVIEW |
| Balduzzi A, Dalle JH, Jahnukainen K, von Wolff M, Lucchini G, Iversen M, Macklon KT, Poirot C, Diesch T, Jarisch A et al. Fertility preservation issues in pediatric hematopoietic stem cell transplantation: practical approaches from the consensus of the Pediatric Diseases Working Party of the EBMT and the International BFM Study Group. <i>Bone marrow transplantation</i> 2017;52: 1406-1415. | EXPERT OPINION |
| Balkenende, E.M., et al., Reproductive outcomes after oocyte banking for fertility preservation. <i>Reprod Biomed Online</i> , 2018. 37(4): p. 425-433. | use of oocytes - not discussed in the guideline |
| Batuhan O, Safaa AH. Techniques for ovarian tissue, whole ovary, oocyte and embryo cryopreservation. <i>Journal of reproduction & infertility</i> 2010;11: 3-15. | REVIEW |
| Baylis F. Left out in the cold: arguments against non-medical oocyte cryopreservation. <i>Journal of obstetrics and gynaecology Canada : JOGC - Journal d'obstetrique et gynecologie du Canada : JOGC</i> 2015;37: 64-67. | DEBATE - FTNF |
| Ben-Aharon I, Abir R, Perl G, Stein J, Gilad G, Toledano H, Elitzur S, Avrahami G, Ben-Haroush A, Oron G et al. Optimizing the process of fertility preservation in pediatric female cancer patients - a multidisciplinary program. <i>BMC cancer</i> 2016;16: 620. | Feasibility described but no precise outcomes for efficacy or safety |
| Benard J, Duros S, El Hachem H, Sonigo C, Sifer C, Grynberg M. Freezing oocytes or embryos after controlled ovarian hyperstimulation in cancer patients: the state of the art. <i>Future oncology (London, England)</i> 2016;12: 1731-1741. | FTNF |
| Ben-Haroush, A., et al., Effect of letrozole added to gonadotropins in controlled ovarian stimulation protocols on the yield and maturity of retrieved oocytes. <i>Gynecol Endocrinol</i> , 2019. 35(4): p. 324-327. | ovarian stimulation |
| Boldt J. Current results with slow freezing and vitrification of the human oocyte. <i>Reproductive biomedicine online</i> 2011;23: 314-322. | REVIEW |
| Borini A, Coticchio G. The efficacy and safety of human oocyte cryopreservation by slow cooling. <i>Seminars in reproductive medicine</i> 2009;27: 443-449. | REVIEW |
| Borini, A. and G. Coticchio, Oocyte quantity and quality are crucial for a perspective of fertility preservation in women with Turner syndrome. <i>Fertil Steril</i> , 2019. 111(3): p. 461-462. | specific population, not relevant for the question |
| Campagne DM. Delayed childbearing: determining responsibilities for prime gamete quality. <i>The Journal of reproductive medicine</i> 2013;58: 531-537. | ETHICS REVIEW - FTNF |
| Campos, A.P.C., et al., Ovarian response after random-start controlled ovarian stimulation to cryopreserve oocytes in cancer patients. <i>JBRA Assist Reprod</i> , 2018. 22(4): p. 352-354. | included for the question on ovarian stimulation |
| Caserta D, Ralli E, Matteucci E, Marci R, Moscarini M. Fertility preservation in female cancer patients: an emerging challenge for physicians. <i>Panminerva medica</i> 2014;56: 85-95. | FTNF |
| Cavagna, F., et al., Specific protocols of controlled ovarian stimulation for oocyte cryopreservation in breast cancer patients. <i>Curr Oncol</i> , 2018. 25(6): p. e527-e532. | included for the question on ovarian stimulation |
| Chang CC, 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. <i>Fertility and sterility</i> 2013;99: 1891-1897. | STUDY OF INFERTILE WOMEN UNDERGOING IVF |
| Chang HJ, Suh CS. Fertility preservation for women with malignancies: current developments of cryopreservation. <i>Journal of gynecologic oncology</i> 2008;19: 99-107. | REVIEW |
| Chen SU, Lien YR, Chen HF, Chang LJ, Tsai YY, Yang YS. Observational clinical follow-up of oocyte cryopreservation using a slow-freezing method with 1,2-propanediol plus sucrose followed by ICSI. <i>Human reproduction (Oxford, England)</i> 2005;20: 1975-1980. | SLOW FREEZING |
| Chen SU, Yang YS. Slow freezing or vitrification of oocytes: their effects on survival and meiotic spindles, and the time schedule for clinical practice. <i>Taiwanese journal of obstetrics & gynecology</i> 2009;48: 15-22. | REVIEW |
| Chen, D., et al., Oocyte cryopreservation among transmasculine youth: a case series. <i>J Assist Reprod Genet</i> , 2018. 35(11): p. 2057-2061. | Transgender not specifically addressed |
| Chian RC, Wang Y, Li YR. Oocyte vitrification: advances, progress and future goals. <i>Journal of assisted reproduction and genetics</i> 2014;31: 411-420. | TECHNICAL REVIEW |
| Childress KJ, Patil NM, Muscal JA, Dietrich JE, Venkatramani R. Borderline Ovarian Tumor in the Pediatric and Adolescent Population: A Case Series and Literature Review. <i>Journal of pediatric and adolescent gynecology</i> 2018;31: 48-54. | FP BY CONSERVATIVE SURGERY ONLY |
| Choi JK, El Assal R, Ng N, Ginsburg E, Maas RL, Anchan RM, Demirci U. Bio-inspired solute enables preservation of human oocytes using minimum volume vitrification. <i>Journal of tissue engineering and regenerative medicine</i> 2017. | TECHNICAL |
| Choi JK, Yue T, Huang H, Zhao G, Zhang M, He X. The crucial role of zona pellucida in cryopreservation of oocytes by vitrification. <i>Cryobiology</i> 2015;71: 350-355. | TECHNICAL |

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| Cil AP, Bang H, Oktay K. Age-specific probability of live birth with oocyte cryopreservation: an individual patient data meta-analysis. <i>Fertility and sterility</i> 2013;100: 492-499.e493. | EFFICACY REPORTED 2013 METAANALYSIS |
| Cil AP, Turkogeldi L, Seli E. Oocyte Cryopreservation as a Preventive Measure for Age-Related Fertility Loss. <i>Seminars in reproductive medicine</i> 2015;33: 429-435. | REVIEW |
| Cobo A, Bellver J, Domingo J, Perez S, Crespo J, Pellicer A, Remohi J. New options in assisted reproduction technology: the Cryotop method of oocyte vitrification. <i>Reproductive biomedicine online</i> 2008;17: 68-72. | UNSURE IF THESE CASES ARE ALSO REPORTED IN LARGER SERIES FROM THE SAME GROUP |
| Cobo A, Domingo J, Perez S, Crespo J, Remohi J, Pellicer A. Vitrification: an effective new approach to oocyte banking and preserving fertility in cancer patients. <i>Clinical & translational oncology : official publication of the Federation of Spanish Oncology Societies and of the National Cancer Institute of Mexico</i> 2008;10: 268-273. | LARGE NUMBERS BUT UNSURE IF THESE ARE ALSO REPORTED IN LARGER SERIES FROM THE SAME GROUP |
| Cobo A, Garcia-Velasco JA, Coello A, Domingo J, Pellicer A, Remohi J. Oocyte vitrification as an efficient option for elective fertility preservation. <i>Fertility and sterility</i> 2016;105: 755-764.e758. | NO CANCER, ELECTIVE OOCYTE CRYO |
| Coello A, Pellicer A, Cobo A. Vitrification of human oocytes. <i>Minerva ginecologica</i> 2018. | REVIEW |
| da Motta EL, Bonavita M, Alegretti JR, Chehin M, Serafini P. Live birth after 6 years of oocyte vitrification in a survivor with breast cancer. <i>Journal of assisted reproduction and genetics</i> 2014;31: 1397-1400. | CASE REPORT |
| de Groot, S., et al. Effects of controlled ovarian stimulation on toxicity of TAC chemotherapy in early breast cancer patients. <i>Cancer Manag Res.</i> 2018. 10: p. 3931-3935. | ovarian stimulation |
| De Santis L, Coticchio G. Theoretical and experimental basis of slow freezing. <i>Reproductive biomedicine online</i> 2011;22: 125-132. | TECHNICAL REVIEW |
| Deepinder F, Agarwal A. Technical and ethical challenges of fertility preservation in young cancer patients. <i>Reproductive biomedicine online</i> 2008;16: 784-791. | REVIEW |
| Devine K, Mumford SL, Goldman KN, Hodes-Wertz B, Druckenmiller S, Propst AM, Noyes N. Baby budgeting: oocyte cryopreservation in women delaying reproduction can reduce cost per live birth. <i>Fertility and sterility</i> 2015;103: 1446-1453.e1441-1442. | COST ANALYSIS |
| Diaz-Garcia C, Domingo J, Garcia-Velasco JA, Herraiz S, Mirabet V, Iniesta I, Cobo A, Remohi J, Pellicer A. Oocyte vitrification versus ovarian cortex transplantation in fertility preservation for adult women undergoing gonadotoxic treatments: a prospective cohort study. <i>Fertility and sterility</i> 2018. | efficacy of oocyte vs ovariantissue in FP |
| Domingo J, Garcia-Velasco JA. Oocyte cryopreservation for fertility preservation in women with cancer. <i>Current opinion in endocrinology, diabetes, and obesity</i> 2016;23: 465-469. | EXPERT OPINION |
| Dondorp W, de Wert G, Pennings G, Shenfield F, Devroey P, Tarlatzis B, Barri P, Diedrich K. Oocyte cryopreservation for age-related fertility loss. <i>Human reproduction (Oxford, England)</i> 2012;27: 1231-1237. | included for the section on elective cryopreservation |
| Dovey S. Oocyte cryopreservation: advances and drawbacks. <i>Minerva ginecologica</i> 2012;64: 485-500. | NOT RELEVANT |
| Doyle JO, Richter KS, Lim J, Stillman RJ, Graham JR, Tucker MJ. Successful elective and medically indicated oocyte vitrification and warming for autologous in vitro fertilization, with predicted birth probabilities for fertility preservation according to number of cryopreserved oocytes and age at retrieval. <i>Fertility and sterility</i> 2016;105: 459-466.e452. | ANALYSIS OF EFFICACY |
| Edgar DH, Gook DA. How should the clinical efficiency of oocyte cryopreservation be measured? <i>Reproductive biomedicine online</i> 2007;14: 430-435. | REVIEW |
| El-Shawarby SA, Sharif F, Conway G, Serhal P, Davies M. Oocyte cryopreservation after controlled ovarian hyperstimulation in mosaic Turner syndrome: another fertility preservation option in a dedicated UK clinic. <i>BJOG : an international journal of obstetrics and gynaecology</i> 2010;117: 234-237. | CASE REPORT |
| Ezcurra D, Rangnow J, Craig M, Schertz J. The Human Oocyte Preservation Experience (HOPE) a phase IV, prospective, multicenter, observational oocyte cryopreservation registry. <i>Reproductive biology and endocrinology : RB&E</i> 2009;7: 53. | REVIEW |
| Filippi F, Meazza C, Paffoni A, Raspagliesi F, Terenziani M, Somigliana E. Egg Freezing in Childhood and Young Adult Cancer Survivors. <i>Pediatrics</i> 2016;138. | CASE REPORT CHILD |
| Filippi, F., et al. Fertility preservation in women with malignancies: the accuracy of antral follicle count collected randomly during the menstrual cycle in predicting the number of oocytes retrieved. <i>J Assist Reprod Genet.</i> 2019. 36(3): p. 569-578. | ovarian reserve testing |
| Findeklee S, Lotz L, Heusinger K, Hoffmann I, Dittrich R, Beckmann MW. Twenty-five-year-old Woman with Bilateral Borderline Ovarian Tumour Desiring to Preserve Fertility - Case Report and Literature Review on the Current State of Fertility Preservation in Women with Borderline Ovarian Tumours. <i>Geburtshilfe und Frauenheilkunde</i> 2016;76: 1189-1193. | CASE REPORT |
| Forman EJ, Anders CK, Behera MA. Pilot survey of oncologists regarding treatment-related infertility and fertility preservation in female cancer patients. <i>The Journal of reproductive medicine</i> 2009;54: 203-207. | SURVEY OF ONCOLOGISTS |
| Forman EJ, Li X, Ferry KM, Scott K, Treff NR, Scott RT, Jr. Oocyte vitrification does not increase the risk of embryonic aneuploidy or diminish the implantation potential of blastocysts created after intracytoplasmic sperm injection: a novel, paired randomized controlled trial using DNA fingerprinting. <i>Fertility and sterility</i> 2012;98: 644-649. | EXPERIMENTAL EFFECT OF CRYOPRESERVATION - GENETIC TESTING |
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| Oktay K, Kan MT, Rosenwaks Z. Recent progress in oocyte and ovarian tissue cryopreservation and transplantation. <i>Current opinion in obstetrics & gynecology</i> 2001;13: 263-268. | not relevant |
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| Pecker, L.H., et al., Risks associated with fertility preservation for women with sickle cell anemia. <i>Fertil Steril</i> , 2018, 110(4): p. 720-731. | specific population, not relevant for the question |
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| Rodriguez-Wallberg KA. Clinical aspects and perinatal outcomes after cryopreservation of embryos and gametes. <i>Minerva ginecologica</i> 2015;67: 207-215. | REVIEW |
| Ross L, Chung K, Macdonald H. Fertility preservation in the female cancer patient. <i>Journal of surgical oncology</i> 2014;110: 907-911. | EXPERT OPINION |
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| Salama M, Winkler K, Murach KF, Seeber B, Ziehr SC, Wildt L. Female fertility loss and preservation: threats and opportunities. <i>Annals of oncology : official journal of the European Society for Medical Oncology</i> 2013;24: 598-608. | EXPERT OPINION |
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| Saumet J, Petropanagos A, Buzaglo K, McMahon E, Warraich G, Mahutte N. No. 356-Egg Freezing for Age-Related Fertility Decline. <i>Journal of obstetrics and gynaecology Canada : JOGC - Journal d'obstetrique et gynecologie du Canada : JOGC</i> 2018;40: 356-368. | GUIDELINES |
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| Schoolcraft WB, Keller JL, Schlenker T. Excellent embryo quality obtained from vitrified oocytes. <i>Reproductive biomedicine online</i> 2009;19: 820-823. | NO FP |
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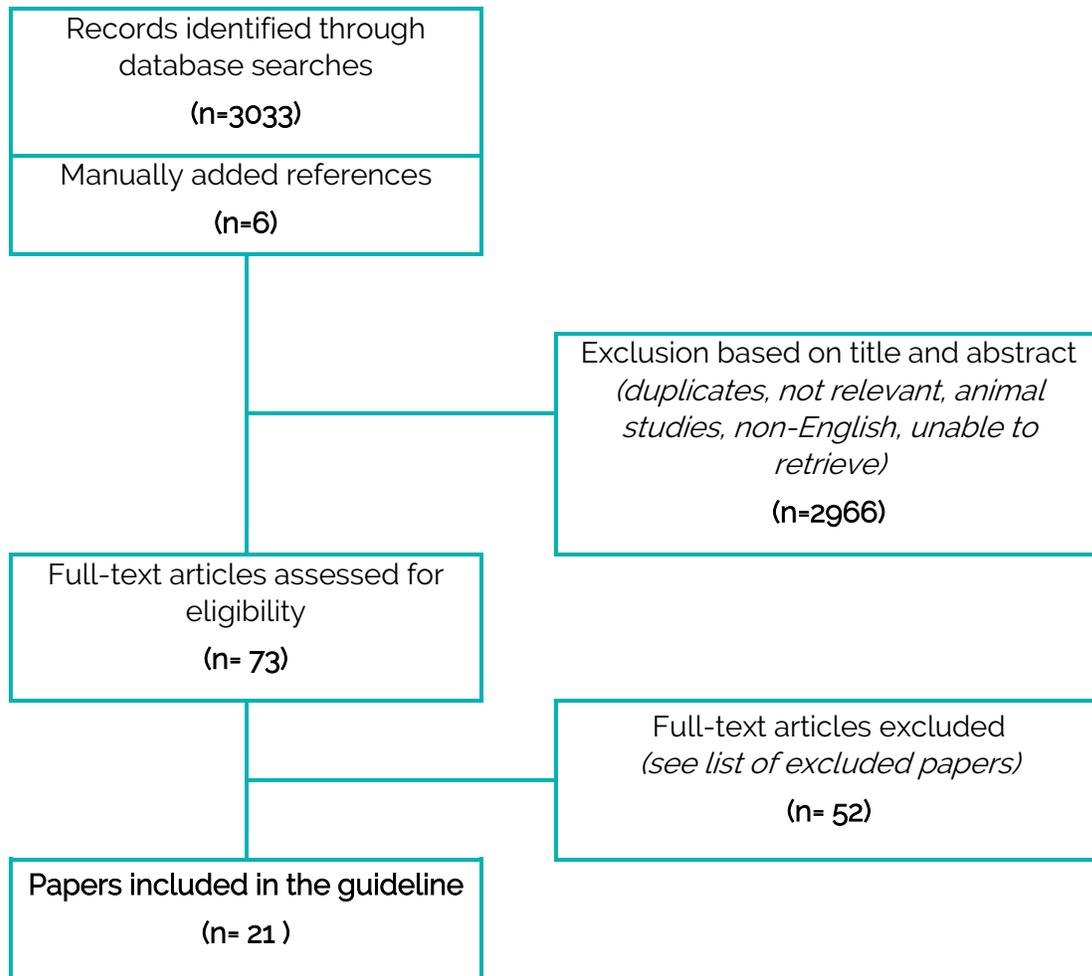
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| Stevenson EL, Hurt MJ, Trotter KJ. Oocyte Cryopreservation for Fertility Preservation in Healthy Women. <i>Nursing for women's health</i> 2017;21: 384-393. | REVIEW |
| Stoop D. From fresh heterologous oocyte donation to autologous oocyte banking. <i>Facts, views & vision in ObGyn</i> 2012;4: 271-282. | NO FP BUT COMPARISON FRESH VS CRYO |
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| Taylan E, Oktay KH. Current state and controversies in fertility preservation in women with breast cancer. <i>World journal of clinical oncology</i> 2017;8: 241-248. | EXPERT OPINION |
| Terenziani M, Meazza C, Massimino M, Vigano P, Gandola L, Mangili G, Raspagliesi F, Biononi D, Podda M, Veneroni L et al. Female fertility preserving practices at a pediatric unit: a challenge of multiprofessional and multidisciplinary cooperation. <i>Tumori</i> 2016;102: 174-177. | only 2 patients underwent oocyte cryo and the results are not discussed |
| Tucker M, Morton P, Liebermann J. Human oocyte cryopreservation: a valid alternative to embryo cryopreservation? <i>European journal of obstetrics, gynecology, and reproductive biology</i> 2004;113 Suppl 1: S24-27. | TECHNICAL OOCYTE CRYO |
| van Loendersloot LL, Moolenaar LM, Mol BW, Repping S, van der Veen F, Goddijn M. Expanding reproductive lifespan: a cost-effectiveness study on oocyte freezing. <i>Human reproduction (Oxford, England)</i> 2011;26: 3054-3060. | COST-EFFICACY |
| Vanni, V.S., et al., Safety of fertility treatments in women with systemic autoimmune diseases (SADs). <i>Expert Opin Drug Saf</i> . 2019. 18(9): p. 841-852. | not fertility preservation |
| Vergier, J., et al., Fertility preservation in Turner syndrome: Karyotype does not predict ovarian response to stimulation. <i>Clin Endocrinol (Oxf)</i> , 2019. 91(5): p. 646-651. | specific population, not relevant for the question |
| von Wolff, M., et al., Fertility preservation: ovarian response to freeze oocytes is not affected by different malignant diseases-an analysis of 992 stimulations. <i>J Assist Reprod Genet</i> , 2018. 35(9): p. 1713-1719. | ovarian stimulation |
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| Weber-Guskar E. Debating social egg freezing: arguments from phases of life. <i>Medicine, health care, and philosophy</i> 2017. | DEBATE |
| Wennberg, A.L., K. Schildauer, and M. Brannstrom, Elective oocyte freezing for nonmedical reasons: a 6-year report on utilization and in vitro fertilization results from a Swedish center. <i>Acta Obstet Gynecol Scand</i> , 2019. 98(11): p. 1429-1434. | use of oocytes - not discussed in the guideline |
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| Yap JK, Davies M. Fertility preservation in female cancer survivors. <i>Journal of obstetrics and gynaecology : the journal of the Institute of Obstetrics and Gynaecology</i> 2007;27: 390-400. | historical review at one center, no results of oocyte cryo described |
| Zhang J, Grifo JA, Del Priore G. Gestational carrier pregnancy with oocytes obtained during surgery for stage IIc ovarian cancer after controlled ovarian stimulation. <i>Fertility and sterility</i> 2005;83: 1547-1549. | case report |
| Zhang L, Yan LY, Zhi X, Yan J, Qiao J. Female fertility: is it safe to "freeze?". <i>Chinese medical journal</i> 2015;128: 390-397. | OLDER REVIEW INCLUDED STUDIES UP TO 2013 |

Q11 Is Embryo cryopreservation effective and safe for fertility preservation?

Search strings

| DATABASE | Search string |
|----------|---|
| pubmed | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) AND ("Embryo cryopreservation" OR "embryo freezing" OR "Embryo slow freezing" OR "Embryo vitrification" OR "Cryopreservation"[Mesh] OR "Cryopreservation" OR "frozen embryo transfer") AND embryo |
| pubmed | ("Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis" OR "Transgender Persons"[Mesh] OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("Embryo cryopreservation" OR "embryo freezing" OR "Embryo slow freezing" OR "Embryo vitrification" OR "Cryopreservation"[Mesh] OR "Cryopreservation" OR "frozen embryo transfer") |
| COCHRANE | (Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis" OR "Transgender Persons" OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation") AND ("Embryo cryopreservation" OR "embryo freezing" OR "Embryo slow freezing" OR "Embryo vitrification" OR "Cryopreservation" OR "frozen embryo transfer") |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|---|---|
| Arnon J, Meirou D, Lewis-Roness H, Ornoy A. Genetic and teratogenic effects of cancer treatments on gametes and embryos. <i>Hum Reprod Update</i> 2001;7: 394-403. | Review, not relevant |
| Ata B, Chian RC, Tan SL. Cryopreservation of oocytes and embryos for fertility preservation for female cancer patients. <i>Best Pract Res Clin Obstet Gynaecol</i> 2010;24: 101-112. | Review, not relevant |
| Ayensu-Coker L, Essig E, Breech LL, Lindheim S. Ethical quandaries in gamete-embryo cryopreservation related to oncofertility. <i>J Law Med Ethics</i> 2013;41: 711-719. | Review, not relevant |
| Azem F, Amit A, Merimsky O, Lessing JB. Successful transfer of frozen-thawed embryos obtained after subtotal colectomy for colorectal cancer and before fluorouracil-based chemotherapy. <i>Gynecol Oncol</i> 2004;93: 263-265. | Case report |
| Azim A, Oktay K. Letrozole for ovulation induction and fertility preservation by embryo cryopreservation in young women with endometrial carcinoma. <i>Fertil Steril</i> 2007;88: 657-664. | Focus on stimulation with letrozole |
| Banker M, Joshi B, Shah P, Patel D. Embryo cryopreservation in a case of acute promyelocytic leukemia, incidentally diagnosed during ovarian stimulation for in-vitro fertilization. <i>J Hum Reprod Sci</i> 2014;7: 224-226. | Case report |
| Baynosa J, Westphal LM, Madrigano A, Wapnir I. Timing of breast cancer treatments with oocyte retrieval and embryo cryopreservation. <i>J Am Coll Surg</i> 2009;209: 603-607. | Focus on timing |
| Bedoschi G, Oktay K. Current approach to fertility preservation by embryo cryopreservation. <i>Fertil Steril</i> 2013;99: 1496-1502. | Review, not relevant |
| Benard J, Duros S, El Hachem H, Sonigo C, Sifer C, Grynberg M. Freezing oocytes or embryos after controlled ovarian hyperstimulation in cancer patients: the state of the art. <i>Future Oncol</i> 2016;12: 1731-1741. | Focus on controlled ovarian stimulation |
| Blumenfeld Z. How to preserve fertility in young women exposed to chemotherapy? The role of GnRH agonist cotreatment in addition to cryopreservation of embryos, oocytes, or ovaries. <i>Oncologist</i> 2007;12: 1044-1054. | Review, not relevant |
| Brown JR, Modell E, Obasaju M, King YK. Natural cycle in-vitro fertilization with embryo cryopreservation prior to chemotherapy for carcinoma of the breast. <i>Hum Reprod</i> 1996;11: 197-199. | Case report |
| Cimadomo D, Fabozzi G, Vaiarelli A, Ubaldi N, Ubaldi FM, Rienzi L. Impact of Maternal Age on Oocyte and Embryo Competence. <i>Front Endocrinol (Lausanne)</i> 2018;9: 327. | Review, not relevant |
| Cordeiro CN, Christianson MS, Selter JH, Segars JH, Jr. In Vitro Activation: A Possible New Frontier for Treatment of Primary Ovarian Insufficiency. <i>Reprod Sci</i> 2016;23: 429-438. | Out of scope |
| Danis RB, Pereira N, Elias RT. Random Start Ovarian Stimulation for Oocyte or Embryo Cryopreservation in Women Desiring Fertility Preservation Prior to Gonadotoxic Cancer Therapy. <i>Curr Pharm Biotechnol</i> 2017;18: 609-613. | Focus on random start stimulation |
| Gallot D, Pouly JL, Janny L, Mage G, Canis M, Wattiez A, Bruhat MA. Successful transfer of frozen-thawed embryos obtained immediately before radical surgery for stage IIIa serous borderline ovarian tumour: case report. <i>Hum Reprod</i> 2000;15: 2347-2350. | Case report surgical treatment |
| Grifo J, Adler A, Lee HL, Morin SJ, Smith M, Lu L, Hodes-Wertz B, McCaffrey C, Berkeley A, Munne S. Deliveries from trophectoderm biopsied, fresh and vitrified blastocysts derived from polar body biopsied, vitrified oocytes. <i>Reprod Biomed Online</i> 2015;31: 210-216. | Oocyte cryopreservation |
| Hammarberg K, Kirkman M, Stern C, McLachlan RI, Gook D, Rombauts L, Vollenhoven B, Fisher JRW. Cryopreservation of reproductive material before cancer treatment: a qualitative study of health care professionals' views about ways to enhance clinical care. <i>BMC Health Serv Res</i> 2017;17: 343. | Not relevant for the key question |
| Herrero L, Martinez M, Garcia-Velasco JA. Current status of human oocyte and embryo cryopreservation. <i>Curr Opin Obstet Gynecol</i> 2011;23: 245-250. | Review, not relevant |
| Ho JR, Woo I, Louie K, Salem W, Jabara SI, Bendikson KA, Paulson RJ, Chung K. A comparison of live birth rates and perinatal outcomes between cryopreserved oocytes and cryopreserved embryos. <i>J Assist Reprod Genet</i> 2017;34: 1359-1366. | Comparison study of embryo cryo vs oocyte cryo |
| Hodes-Wertz B, Noyes N, Mullin C, McCaffrey C, Grifo JA. Retrospective analysis of outcomes following transfer of previously cryopreserved oocytes, pronuclear zygotes and supernumerary blastocysts. <i>Reprod Biomed Online</i> 2011;23: 118-123. | Retrospective study |
| Juretzka MM, O'Hanlan KA, Katz SL, El-Danasouri I, Westphal LM. Embryo cryopreservation after diagnosis of stage IIB endometrial cancer and subsequent pregnancy in a gestational carrier. <i>Fertil Steril</i> 2005;83: 1041. | Case report |
| Kato K. Vitrification of embryos and oocytes for fertility preservation in cancer patients. <i>Reprod Med Biol</i> 2016;15: 227-233. | Reference to studies on oocyte cryopreservation |
| Ku LT, Elster N, Nakajima ST. Frozen embryos: a life-saving option. <i>Fertil Steril</i> 2008;90: 849.e815-846. | Case report |
| Kuroda, K., et al., Combination Treatment of Preoperative Embryo Cryopreservation and Endoscopic Surgery (Surgery-ART Hybrid Therapy) in Infertile Women with Diminished Ovarian Reserve and Uterine Myomas or Ovarian Endometriomas. <i>J Minim Invasive Gynecol</i> . 2019. 26(7): p. 1369-1375. | Not relevant |
| Laskov I, Michaan N, Many A, Amit A, Azem F. Successful pregnancy following transfer of frozen-thawed embryos in a patient with pseudomyxoma peritonei who underwent peritonectomy and bilateral oophorectomy. <i>J Gynecol Oncol</i> 2012;23: 129-132. | Case report |
| Letourneau, J.M., et al., Fertility preservation before breast cancer treatment appears unlikely to affect disease-free survival at a median follow-up of 43 months after fertility-preservation consultation. <i>Cancer</i> . 2019. | Association disease free survival |
| Liebermann J. Chapter 11 Human Embryo Vitrification. <i>Methods Mol Biol</i> 2017;1568: 141-159. | Full text not available for assessment |
| Liebermann J. Vitrification: a simple and successful method for cryostorage of human blastocysts. <i>Methods Mol Biol</i> 2015;1257: 305-319. | Full text not available for assessment |

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| Meniru GI, Craft I. In vitro fertilization and embryo cryopreservation prior to hysterectomy for cervical cancer. <i>Int J Gynaecol Obstet</i> 1997;56: 69-70. | Case report |
| Mohsenzadeh M, Khalili MA, Tabibnejad N, Yari N, Agha-Rahimi A, Karimi-Zarchi M. Embryo Cryopreservation Following In-Vitro Maturation for Fertility Preservation in a Woman with Mullerian Adenosarcoma: A Case Report. <i>J Hum Reprod Sci</i> 2017;10: 138-141. | Case Report of one case of IVM+embryo cryo |
| Oktay K, Buyuk E, Davis O, Yermakova I, Veeck L, Rosenwaks Z. Fertility preservation in breast cancer patients: IVF and embryo cryopreservation after ovarian stimulation with tamoxifen. <i>Hum Reprod</i> 2003;18: 90-95. | Early report of pregnancies after cryopreserved embryos in women with cancer |
| Oktay K, Buyuk E, Libertella N, Akar M, Rosenwaks Z. Fertility preservation in breast cancer patients: a prospective controlled comparison of ovarian stimulation with tamoxifen and letrozole for embryo cryopreservation. <i>J Clin Oncol</i> 2005;23: 4347-4353. | Ovarian stimulation |
| Prasath EB, Chan ML, Wong WH, Lim CJ, Tharmalingam MD, Hendricks M, Loh SF, Chia YN. First pregnancy and live birth resulting from cryopreserved embryos obtained from in vitro matured oocytes after oophorectomy in an ovarian cancer patient. <i>Hum Reprod</i> 2014;29: 276-278. | Case report |
| Rienzi L, Ubaldi FM. Oocyte versus embryo cryopreservation for fertility preservation in cancer patients: guaranteeing a women's autonomy. <i>J Assist Reprod Genet</i> 2015;32: 1195-1196. | Editorial - opinion no relevant data on embryo banking |
| Robertson AD, Missmer SA, Ginsburg ES. Embryo yield after in vitro fertilization in women undergoing embryo banking for fertility preservation before chemotherapy. <i>Fertil Steril</i> 2011;95: 588-591. | Small cohort |
| Rodriguez-Wallberg KA. Clinical aspects and perinatal outcomes after cryopreservation of embryos and gametes. <i>Minerva Ginecol</i> 2015;67: 207-215. | Review, not relevant |
| Ron-el R, Vinder A, Golan A, Herman A, Raziel A, Caspi E, Sidi Y. The use of intravenous gammaglobulin, heparin and aspirin in the maintenance of pregnancy of freeze thawed embryo in a patient with lupus-type anticoagulant. <i>Eur J Obstet Gynecol Reprod Biol</i> 1993;52: 131-133. | Case report |
| Sabatini ME, Wolkovich AM, Macklin EA, Wright DL, Souter I, Toth TL. Pronuclear embryo cryopreservation experience: outcomes for reducing the risk of ovarian hyperstimulation syndrome and for fertility preservation in cancer patients. <i>J Assist Reprod Genet</i> 2011;28: 279-284. | Small cohort |
| Shalom-Paz E, Almog B, Shehata F, Huang J, Holzer H, Chian RC, Son WY, Tan SL. Fertility preservation for breast-cancer patients using IVM followed by oocyte or embryo vitrification. <i>Reprod Biomed Online</i> 2010;21: 566-571. | IVM |
| Sioulas VD, Gracia CR. Ovarian stimulation and embryo banking for fertility preservation in a woman with severe mixed connective tissue disease: Is it safe? <i>J Assist Reprod Genet</i> 2012;29: 271-275. | Case report |
| Smith GD, Silva ESCA. Developmental consequences of cryopreservation of mammalian oocytes and embryos. <i>Reprod Biomed Online</i> 2004;9: 171-178. | Review, not relevant |
| Son WY, Chung JT, Gidoni Y, Holzer H, Levin D, Chian RC, Tan SL. Comparison of survival rate of cleavage stage embryos produced from in vitro maturation cycles after slow freezing and after vitrification. <i>Fertil Steril</i> 2009;92: 956-958. | Comparison of cryopreservation of embryos - IVM |
| Stat bite: Patients' plans for frozen embryos. <i>J Natl Cancer Inst</i> 2007;99: 1287. | Article out of scope on willingness to donate frozen embryos to research |
| Storage of gametes or embryos for cancer patients. <i>Bull Med Ethics</i> 1996;No. 115: 8-10. | Full text not available for assessment |
| Takahashi, N., et al., Factors associated with successful pregnancy in women of late reproductive age with uterine fibroids who undergo embryo cryopreservation before surgery. <i>J Obstet Gynaecol Res</i> , 2018. 44(10): p. 1956-1962. | Uterine fibroids |
| Vanni, V.S., et al., Safety of fertility treatments in women with systemic autoimmune diseases (SADs). <i>Expert Opin Drug Saf</i> , 2019. 18(9): p. 841-852. | Not embryo specific |
| Vogt, K.S., et al., Preserving fertility in women with cancer (PreFer): Decision-making and patient-reported outcomes in women offered egg and embryo freezing prior to cancer treatment. <i>Psychooncology</i> , 2018. 27(12): p. 2725-2732. | Decision making |
| Whitworth A. Freezing embryos--a woman's best option, but is it legal? <i>J Natl Cancer Inst</i> 2006;98: 1359. | Focus on law, which have changed over the years |
| Wininger JD, Taylor TH, Orris JJ, Glassner M, Anderson SH. Pregnancy after rebiopsy and vitrification of blastocysts following allele dropout after day 3 biopsy. <i>Fertil Steril</i> 2011;95: 1122.e1121-1122. | Case report of pre-implantation genetic diagnosis |
| Wirleitner B, Vanderzwalmen P, Bach M, Baramsai B, Neyer A, Schwerda D, Schuff M, Spitzer D, Stecher A, Zintz M et al. The time aspect in storing vitrified blastocysts: its impact on survival rate, implantation potential and babies born. <i>Hum Reprod</i> 2013;28: 2950-2957. | Vitrification of blastocysts |
| Yang D, Brown SE, Nguyen K, Reddy V, Brubaker C, Winslow KL. Live birth after the transfer of human embryos developed from cryopreserved oocytes harvested before cancer treatment. <i>Fertil Steril</i> 2007;87: 1469.e1461-1464. | Study of cryopreservation of oocytes |
| Yurchuk, T., M. Petrushko, and B. Fuller. Science of cryopreservation in reproductive medicine - Embryos and oocytes as exemplars. <i>Early Hum Dev</i> , 2018. 126: p. 6-9. | Historical overview |

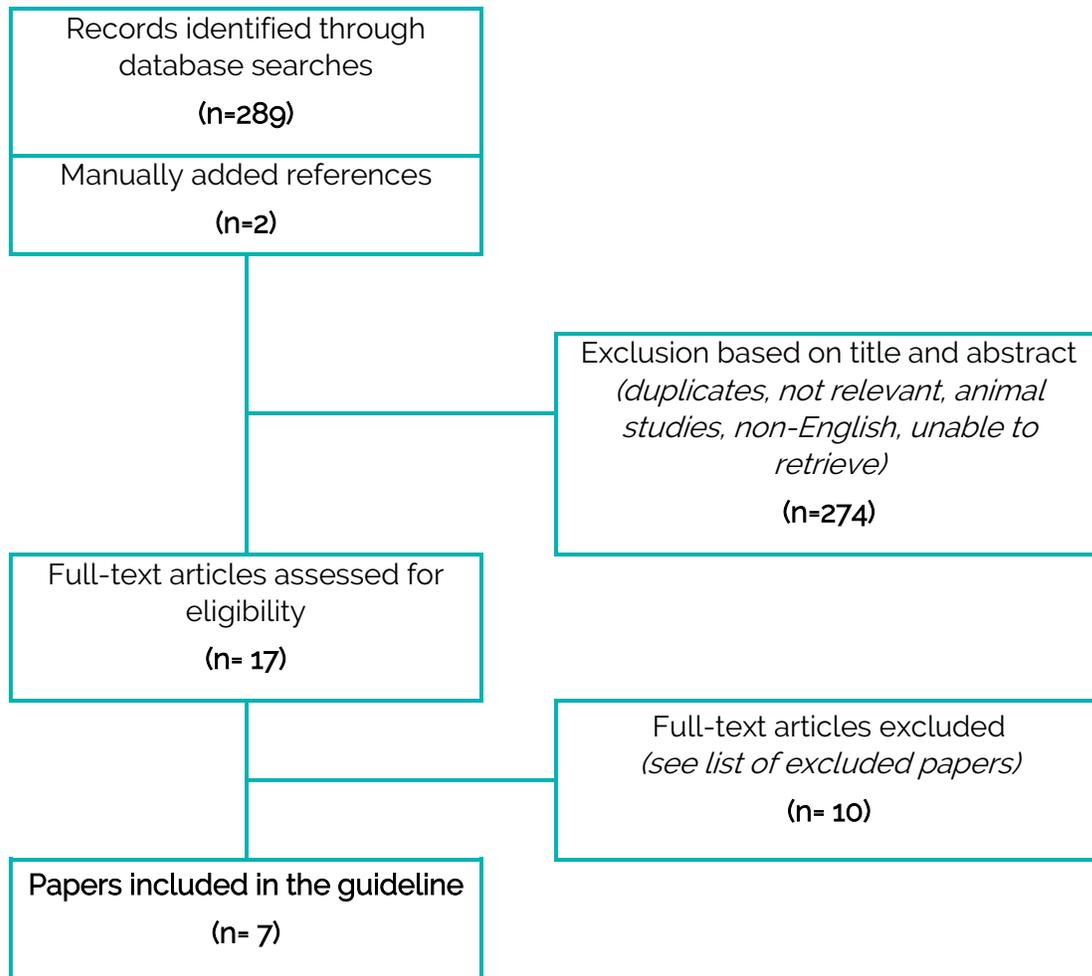
Q12 How should ovarian stimulation be performed in cancer patients undergoing FP treatment?

Search strings

| DATABASE | Search string |
|------------------|--|
| PUBMED Merged | ((("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) OR ("Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis") OR ("Transgender Persons"[Mesh] OR Transgender OR Transsexual) OR ("anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR ("Fertility Preservation"[Mesh] OR "Fertility Preservation")) AND ("ovarian stimulation" OR "OHSS" OR "hyperstimulation" OR "Ovulation Induction"[Mesh] OR "Ovulation Induction")) |
| COCHRANE | (Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis" OR "Transgender Persons" OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation") AND ("ovarian stimulation" OR "OHSS" OR "hyperstimulation" OR "Ovulation Induction") |

Literature search was limited to papers published between 1 november 2018 (deadline for inclusion of papers in the ESHRE Guideline on ovarian stimulation) and 1 november 2019.

Flowchart



List of excluded papers

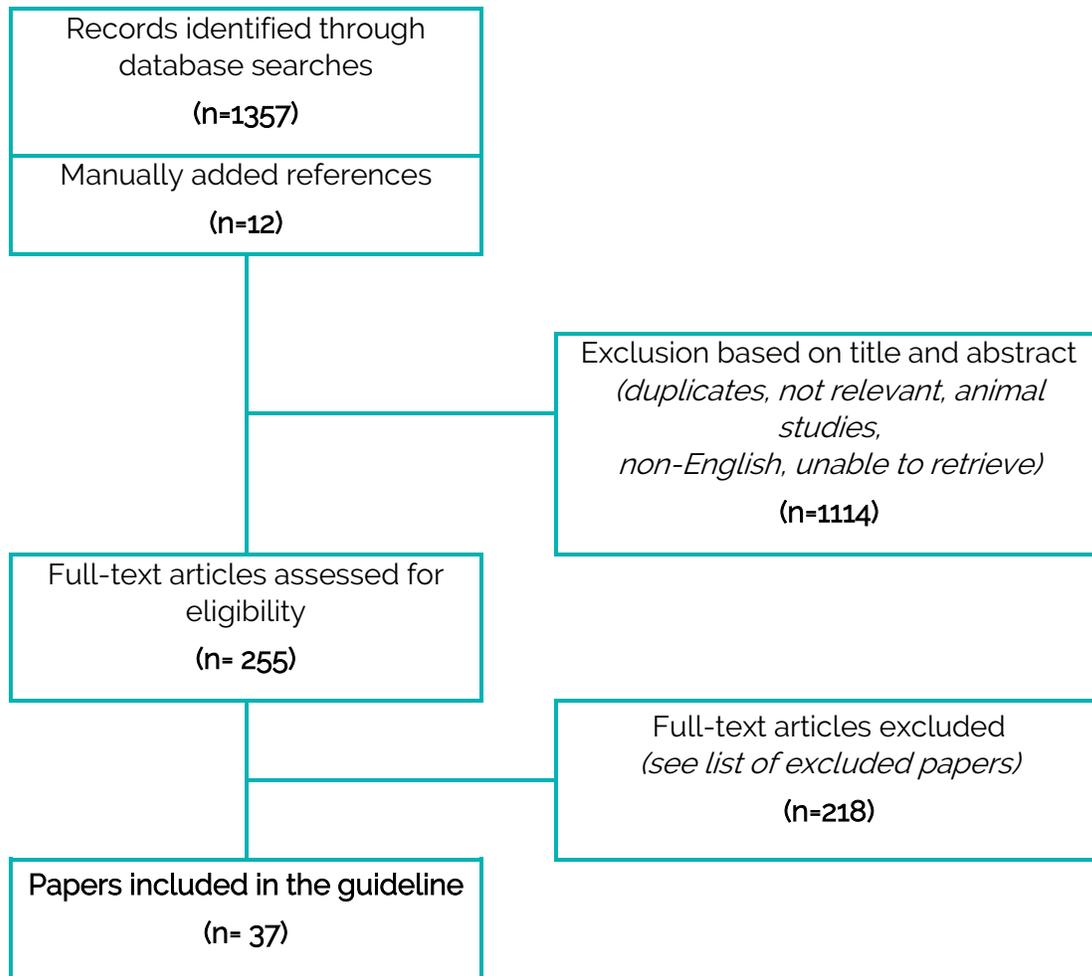
| Reference | Exclusion criterium |
|---|---|
| Jochum, F., et al., Luteal phase stimulation, the future of fertility preservation? Retrospective cohort study of luteal phase versus follicular phase stimulation. <i>J Gynecol Obstet Hum Reprod</i> , 2019, 48(2): p. 91-94. | not relevant for the key question |
| Wald, K., et al., Back-to-back random-start ovarian stimulation prior to chemotherapy to maximize oocyte yield. <i>J Assist Reprod Genet</i> , 2019, 36(6): p. 1161-1168. | case series of 15 patients |
| Volodarsky-Perel, A., et al., Effects of cancer stage and grade on fertility preservation outcome and ovarian stimulation response. <i>Hum Reprod</i> , 2019, 34(3): p. 530-538. | not relevant for the key question |
| Grynberg, M., et al., BRCA1/2 gene mutations do not affect the capacity of oocytes from breast cancer candidates for fertility preservation to mature in vitro. <i>Hum Reprod</i> , 2019, 34(2): p. 374-379. | IVM |
| Nakasuji, T., et al., Random-start ovarian stimulation with aromatase inhibitor for fertility preservation in women with Japanese breast cancer. <i>Reprod Med Biol</i> , 2019, 18(2): p. 167-172. | small observational study - 34 patients |
| Sonigo, C., et al., Impact of letrozole supplementation during ovarian stimulation for fertility preservation in breast cancer patients. <i>Eur J Obstet Gynecol Reprod Biol X</i> , 2019, 4: p. 100049. | COS with letrozole supplementation |
| Kim, S.S., Ovarian stimulation for fertility preservation in women diagnosed with cancer. <i>Fertil Steril</i> , 2018, 110(7): p. 1269-1270. | Publication type |
| Turan, V., et al., The impact of malignancy on response to ovarian stimulation for fertility preservation: a meta-analysis. <i>Fertil Steril</i> , 2018, 110(7): p. 1347-1355. | meta-analysis on older data, included in the Guideline on ovarian stimulation |
| Rousset-Jablonski, C., et al., Fertility preservation, contraception and menopause hormone therapy in women treated for rare ovarian tumours: guidelines from the French national network dedicated to rare gynaecological cancers. <i>Eur J Cancer</i> , 2019, 116: p. 35-44. | Publication type |
| Grynberg, M., et al., Can we perform flexible antagonist protocol for luteal phase ovarian stimulation for breast cancer patients seeking fertility preservation? Fertility and sterility. Conference: 74th annual congress of the american society for reproductive medicine, ASRM 2018. Denver colorado, united states, 2018. 110(4): p. e85-e86. | Publication type |

Q13 Should ovarian tissue cryopreservation vs. no intervention be used for fertility preservation?

Search strings

| DATABASE | Search string |
|--------------------|--|
| PUBMED MERGED | (("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) OR ("Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassaemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis") OR ("Transgender Persons"[Mesh] OR Transgender OR Transsexual) OR ("anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing") OR ("Fertility Preservation"[Mesh] OR "Fertility Preservation")) AND ("ovarian tissue cryopreservation" OR ("ovarian tissue" AND "surgery") OR "ovarian tissue transplantation" OR "ovarian tissue freezing" OR "ovarian cortex cryopreservation") |
| COCHRANE MERGED | ((Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) OR ("Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis") OR ("Transgender Persons" OR Transgender OR Transsexual) OR ("anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing") OR ("Fertility Preservation")) AND ("ovarian tissue cryopreservation" OR "ovarian tissue transplantation" OR "ovarian tissue freezing" OR "ovarian cortex cryopreservation") |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|--|---|
| Abir R, Ben-Aharon I, Garor R, Yaniv I, Ash S, Stemmer SM, Ben-Haroush A, Freud E, Kravarusic D, Sapir O et al. Cryopreservation of in vitro matured oocytes in addition to ovarian tissue freezing for fertility preservation in paediatric female cancer patients before and after cancer therapy. <i>Hum Reprod</i> 2016;31: 750-762. | Larger series of OTC combined with IVM in pediatric patients |
| Adhikari D. In vitro activation of dormant follicles for fertility preservation. <i>Adv Exp Med Biol</i> 2013;761: 29-42. | Full text not available |
| Akar ME, Carrillo AJ, Jennell JL, Yalcinkaya TM. Robotic-assisted laparoscopic ovarian tissue transplantation. <i>Fertil Steril</i> 2011;95: 1120.e1125-1128. | case report |
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| Tanbo T, Greggains G, Storeng R, Busund B, Langebrenke A, Fedorcsak P. Autotransplantation of cryopreserved ovarian tissue after treatment for malignant disease - the first Norwegian results. <i>Acta Obstet Gynecol Scand</i> 2015;94: 937-941. | Included in the Gellert 2018 review |
| Tao T, Del Valle A. Human oocyte and ovarian tissue cryopreservation and its application. <i>J Assist Reprod Genet</i> 2008;25: 287-296. | Narrative review on FP procedures |
| Tian T, Zhao G, Han D, Zhu K, Chen D, Zhang Z, Wei Z, Cao Y, Zhou P. Effects of vitrification cryopreservation on follicular morphology and stress relaxation behaviors of human ovarian | Cryopreservation technique |

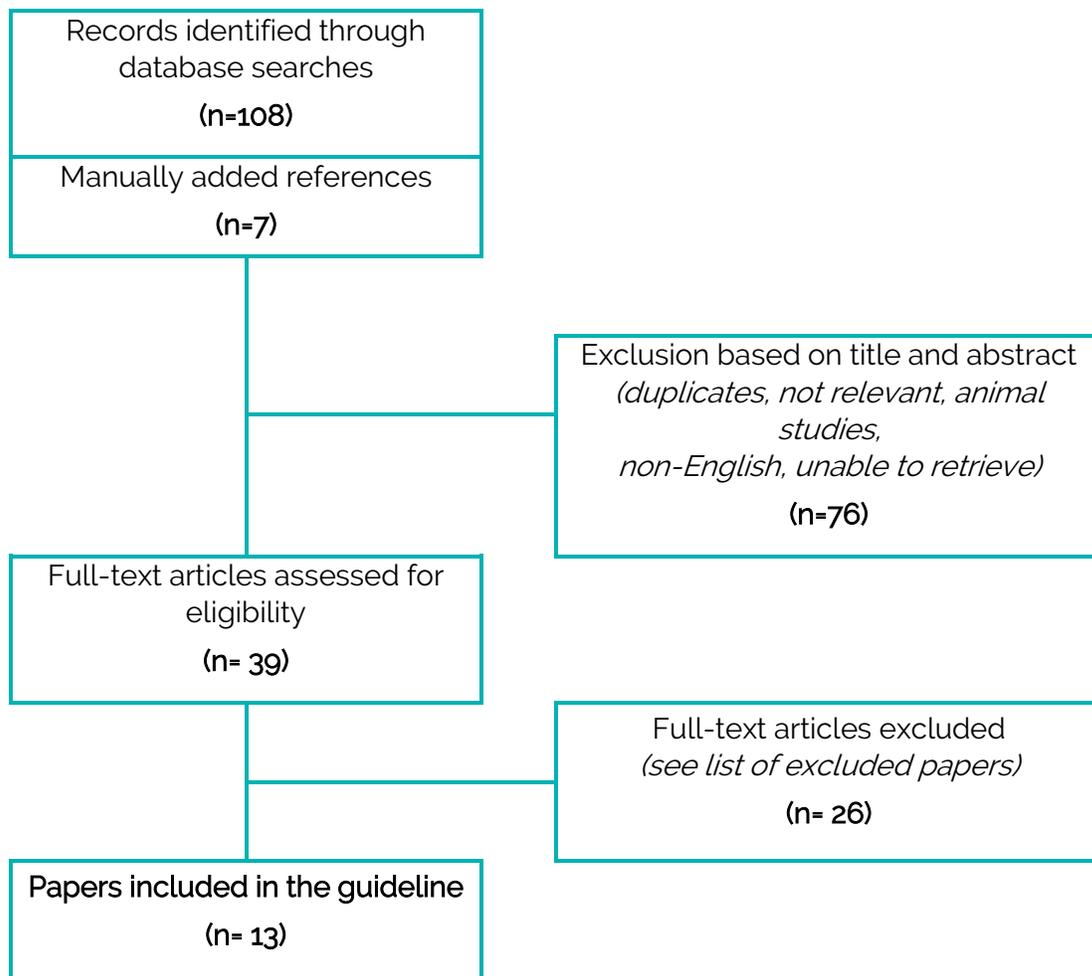
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| Virant-Klun I, Vogler A. In vitro maturation of oocytes from excised ovarian tissue in a patient with autoimmune ovarian insufficiency possibly associated with Epstein-Barr virus infection. Reprod Biol Endocrinol 2018;16: 33. | case report |
| von Wolff M, Donnez J, Hovatta O, Keros V, Maltaris T, Montag M, Salle B, Sonmezer M, Andersen CY. Cryopreservation and autotransplantation of human ovarian tissue prior to cytotoxic therapy--a technique in its infancy but already successful in fertility preservation. Eur J Cancer 2009;45: 1547-1553. | Narrative review |
| von Wolff, M., N. Sanger, and J. Liebenthron, Is Ovarian Tissue Cryopreservation and Transplantation Still Experimental? It Is a Matter of Female Age and Type of Cancer. J Clin Oncol, 2018: p. Jco1800425. | letter |
| Voultsov P, Raikos N, Vasileiadis N, Spiliopoulou C, Tarlatzis B. Ethico-legal issues related to ovarian tissue transplantation. Med Sci Law 2016. | Full text not available |
| Wilken-Jensen HN, Kristensen SG, Jeppesen JV, Yding Andersen C. Developmental competence of oocytes isolated from surplus medulla tissue in connection with cryopreservation of ovarian tissue for fertility preservation. Acta Obstet Gynecol Scand 2014;93: 32-37. | results of ex vivo IVM |
| Yin H, Jiang H, Kristensen SG, Andersen CY. Vitrification of in vitro matured oocytes collected from surplus ovarian medulla tissue resulting from fertility preservation of ovarian cortex tissue. J Assist Reprod Genet 2016;33: 741-746. | OTC combined with IVM |
| Yin H, Kristensen SG, Jiang H, Rasmussen A, Andersen CY. Survival and growth of isolated pre-antral follicles from human ovarian medulla tissue during long-term 3D culture. Hum Reprod 2016;31: 1531-1539. | OTC combined with collection of primordial and secondary follicles in medulla |
| Zakova J, Sedlackova M, Polak S, Dumkova J, Ventruba P, Crha I. Methods for preserving fertility in young women suffering from cancer: some aspects of ovarian tissue cryopreservation. Bratisl Lek Listy 2012;113: 192-194. | Full text not available |
| Zver, T., et al., A new method for evaluating the risk of transferring leukemic cells with transplanted cryopreserved ovarian tissue. J Assist Reprod Genet, 2015, 32(8): p. 1263-6. | Relevant for the question on OTT |
| Zver, T., et al., Minimal residual disease detection in cryopreserved ovarian tissue by multicolor flow cytometry in acute myeloid leukemia. Haematologica, 2014, 99(12): p. e249-52. | Relevant for the question on OTT |

Q14 Should vitrification vs slow freezing be used for ovarian tissue cryopreservation for fertility preservation?

Search strings

| DATABASE | Search string |
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| PUBMED | ("Ovarian tissue" OR "ovarian cortex" OR "ovary" OR "Ovarian cryopreservation") AND ("Vitrification"[Mesh] OR vitrification) AND ("slow freezing" OR "slow cooling" OR freezing) |
| COCHRANE | ("Ovarian tissue" OR "ovarian cortex" OR "ovary" OR "Ovarian cryopreservation") AND (vitrification) AND "slow freezing" |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
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| Amorim CA, Curaba M, Van Langendonck A, Dolmans MM, Donnez J. Vitrification as an alternative means of cryopreserving ovarian tissue. <i>Reproductive biomedicine online</i> 2011;23: 160-186. | Review focusing on the different protocols, but no additional information compared to Shi 2017 |
| Bastings L, Westphal JR, Beerendonk CC, Bekkers RL, Zusterzeel PL, Hendriks JC, Braat DD, Peek R. Clinically applied procedures for human ovarian tissue cryopreservation result in different levels of efficacy and efficiency. <i>Journal of assisted reproduction and genetics</i> 2016;33: 1605-1614. | Relevant outcomes are not assessed (Comparison of 2 slow-freezing and 2 thawing protocols on follicular viability) |
| Batuhan O, Safaa AH. Techniques for ovarian tissue, whole ovary, oocyte and embryo cryopreservation. <i>Journal of reproduction & infertility</i> 2010;11: 3-15. | Review of cryopreservation method focusing mainly on oocytes and embryos |
| Chang HJ, Moon JH, Lee JR, Jee BC, Suh CS, Kim SH. Optimal condition of vitrification method for cryopreservation of human ovarian cortical tissues. <i>The journal of obstetrics and gynaecology research</i> 2011;37: 1092-1101. | Included in review Shi 2017 |
| Cutting R, Bartlow S, Anderson R. Human oocyte cryopreservation: evidence for practice. <i>Human fertility</i> 2009;12: 125-136. | Out of topic: Oocytes cryopreservation |
| Diaz-Garcia C, Domingo J, Garcia-Velasco JA, Herraiz S, Mirabet V, Iniesta I, Cobo A, Remohi J, Pellicer A. Oocyte vitrification versus ovarian cortex transplantation in fertility preservation for adult women undergoing gonadotoxic treatments: a prospective cohort study. <i>Fertility and sterility</i> 2018;109: 478-485.e472. | relevant outcomes are not assessed (outcomes of oocytes vitrification versus ovarian tissue cryopreservation) |
| Gamzatova Z, Komlichenko E, Kostareva A, Galagudza M, Ulrikh E, Zubareva T, Sheveleva T, Nezhentseva E, Kalinina E. Autotransplantation of cryopreserved ovarian tissue--effective method of fertility preservation in cancer patients. <i>Gynecological endocrinology</i> 2014;30 Suppl 1: 43-47. | Narrative review |
| Huang L, Mo Y, Wang W, Li Y, Zhang Q, Yang D. Cryopreservation of human ovarian tissue by solid-surface vitrification. <i>European journal of obstetrics, gynecology, and reproductive biology</i> 2008;139: 193-198. | Included in review Shi 2017 |
| Isachenko V, Isachenko E, Weiss JM, Todorov P, Kreienberg R. Cryobanking of human ovarian tissue for anti-cancer treatment: comparison of vitrification and conventional freezing. <i>Cryo letters</i> 2009;30: 449-454. | Mixed of review and personal data with no methodology described |
| Jeong K, Aslan E, Ozkaya E, Sonmezer M, Oktay K. Ovarian cryopreservation. <i>Minerva medica</i> 2012;103: 37-46. | Full text not available |
| Keros V, Xella S, Hulthenby K, Pettersson K, Sheikhi M, Volpe A, Hreinsson J, Hovatta O. Vitrification versus controlled-rate freezing in cryopreservation of human ovarian tissue. <i>Human reproduction</i> 2009;24: 1670-1683. | Included in review Shi 2017 |
| Klocke S, Bundgen N, Koster F, Eichenlaub-Ritter U, Griesinger G. Slow-freezing versus vitrification for human ovarian tissue cryopreservation. <i>Archives of gynecology and obstetrics</i> 2015;291: 419-426. | Included in review Shi 2017 |
| Kokotsaki, M., et al., Impact of vitrification on granulosa cell survival and gene expression. <i>Cryobiology</i> , 2018. 85: p. 73-78. | cell line study |
| Li YB, Zhou CQ, Yang GF, Wang Q, Dong Y. Modified vitrification method for cryopreservation of human ovarian tissues. <i>Chinese medical journal</i> 2007;120: 110-114. | Included in review Shi 2017 |
| Nakamura Y, Obata R, Okuyama N, Aono N, Hashimoto T, Kyono K. Residual ethylene glycol and dimethyl sulphoxide concentration in human ovarian tissue during warming/thawing steps following cryopreservation. <i>Reproductive biomedicine online</i> 2017;35: 311-313. | Evaluates residual cryoprotectant after thawing using both techniques |
| Nikiforov, D., et al., Innovative multi-protectoral approach increases survival rate after vitrification of ovarian tissue and isolated follicles with improved results in comparison with conventional method. <i>J Ovarian Res</i> , 2018. 11(1): p. 65. | animal model |
| Oktem O, Alper E, Balaban B, Palaoglu E, Peker K, Karakaya C, Urman B. Vitrified human ovaries have fewer primordial follicles and produce less antimullerian hormone than slow-frozen ovaries. <i>Fertility and sterility</i> 2011;95: 2661-2664.e2661. | Included in review Shi 2017 |
| Salehnia M, Sheikhi M, Pourbeiranvand S, Lundqvist M. Apoptosis of human ovarian tissue is not increased by either vitrification or rapid cooling. <i>Reproductive biomedicine online</i> 2012;25: 492-499. | Does not answer the key question: Vitrification versus fresh |
| Sanfilippo S, Canis M, Smitz J, Sion B, Darcha C, Janny L, Brugnon F. Vitrification of human ovarian tissue: a practical and relevant alternative to slow freezing. <i>Reproductive biology and endocrinology : RB&E</i> 2015;13: 67. | Included in review Shi 2017 |
| Son WY, Chung JT, Gidoni Y, Holzer H, Levin D, Chian RC, Tan SL. Comparison of survival rate of cleavage stage embryos produced from in vitro maturation cycles after slow freezing and after vitrification. <i>Fertility and sterility</i> 2009;92: 956-958. | Out of topic: Oocytes cryopreservation |
| Suzuki N, Yoshioka N, Takae S, Sugishita Y, Tamura M, Hashimoto S, Morimoto Y, Kawamura K. Successful fertility preservation following ovarian tissue vitrification in patients with primary ovarian insufficiency. <i>Human reproduction</i> 2015;30: 608-615. | Case report |
| Suzuki N. Ovarian tissue cryopreservation in young cancer patients for fertility preservation. <i>Reproductive medicine and biology</i> 2015;14: 1-4. | Mini review of cryopreservation method (narrative) |
| Xiao Z, Wang Y, Li L, Luo S, Li SW. Needle immersed vitrification can lower the concentration of cryoprotectant in human ovarian tissue cryopreservation. <i>Fertility and sterility</i> 2010;94: 2323-2328. | included in review Shi 2017 |
| Xiao Z, Wang Y, Li LL, Li SW. In vitro culture thawed human ovarian tissue: NIV versus slow freezing method. <i>Cryo letters</i> 2013;34: 520-526. | Included in review Shi 2017 |
| Zhao, Q., et al., Vitrification freezing of large ovarian tissue in the human body. <i>J Ovarian Res</i> , 2019. 12(1): p. 77. | No additional data compared to other studies |

Zhou XH, Zhang D, Shi J, Wu YJ. Comparison of vitrification and conventional slow freezing for cryopreservation of ovarian tissue with respect to the number of intact primordial follicles: A meta-analysis. *Medicine* 2016;95: e4095.

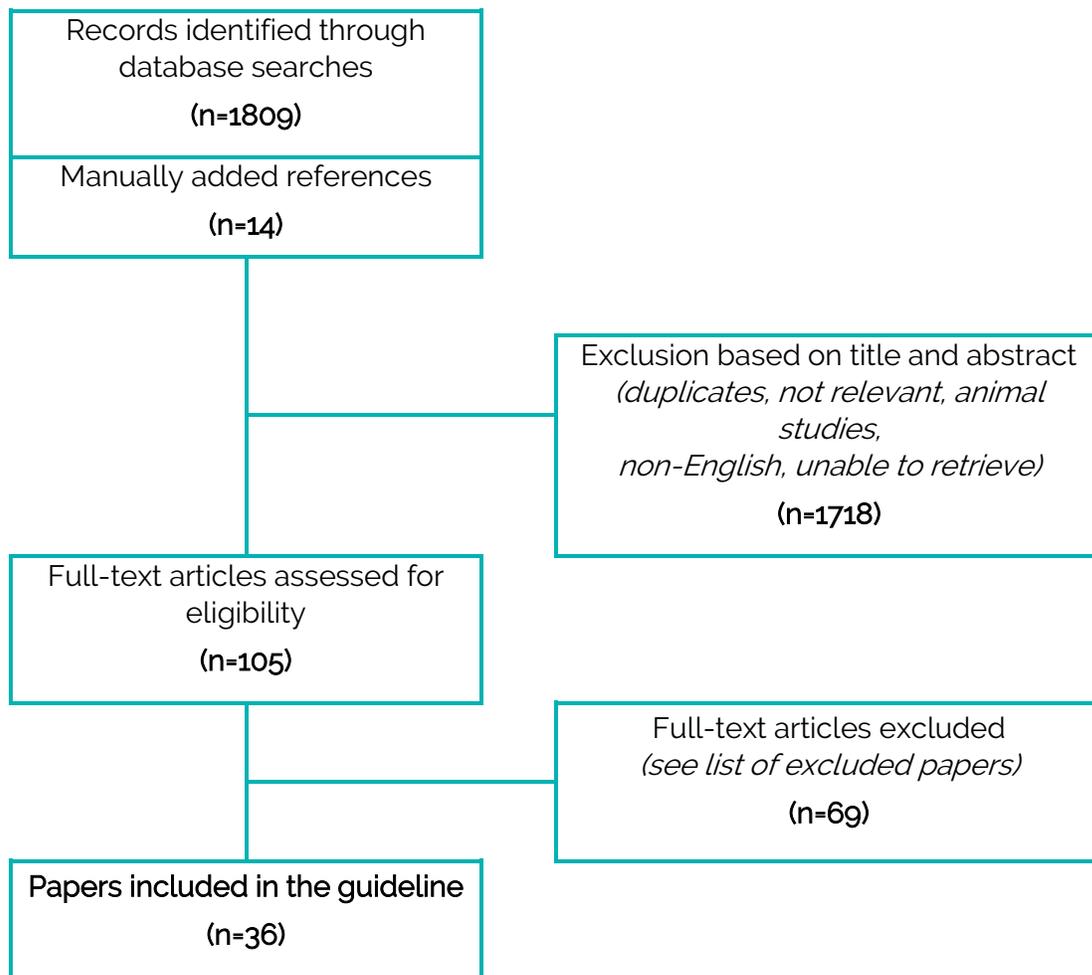
Outcome is the proportion of intact primordial follicles

Q 15 Which safety issues should be considered when replacing ovarian tissue?

Search strings

| DATABASE | Search string |
|----------|---|
| PUBMED | ("Ovarian tissue cryopreservation" OR "ovarian tissue transplantation" OR "ovarian tissue freezing" OR "ovarian cortex cryopreservation" OR ("Ovarian tissue" OR "ovarian cortex" OR "ovary" OR "Ovarian cryopreservation") AND (replacement OR transplantation OR insertion OR reimplantation OR "tissue replacement")) AND (adverse effects [Subheading] OR "Intraoperative Complications"[Mesh] OR "Side effect" OR "Adverse event" OR "adverse effects" OR Complication OR risk OR incident OR "Follicle activation" OR "Follicle loss" OR "malignant contamination" OR contamination OR follow-up OR repetition OR repeated) |
| COCHRANE | ("Ovarian tissue cryopreservation" OR "ovarian tissue transplantation" OR "ovarian tissue freezing" OR "ovarian cortex cryopreservation" OR ("Ovarian tissue" OR "ovarian cortex" OR "ovary" OR "Ovarian cryopreservation") AND (replacement OR transplantation OR insertion OR reimplantation OR "tissue replacement")) AND ("Intraoperative Complications" OR "Side effect" OR "Adverse event" OR "adverse effects" OR Complication OR risk OR incident OR "Follicle activation" OR "Follicle loss" OR "malignant contamination" OR contamination OR follow-up OR repetition OR repeated) |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|---|--|
| Amiot C, Angelot-Delettre F, Zver T, Alvergnas-Vieille M, Saas P, Garnache-Ottou F, Roux C. Minimal residual disease detection of leukemic cells in ovarian cortex by eight-color flow cytometry. <i>Human reproduction</i> 2013;28: 2157-2167. | Technical issue of MRD detection |
| Amorim CA, Shikanov A. The artificial ovary: current status and future perspectives. <i>Future oncology (London, England)</i> 2016;12: 2323-2332. | Full text not available |
| Andersen CY, Kristensen SG, Greve T, Schmidt KT. Cryopreservation of ovarian tissue for fertility preservation in young female oncological patients. <i>Future oncology (London, England)</i> 2012;8: 595-608. | Full text not available |
| Andersen, C.Y., L.S. Mamsen, and S.G. Kristensen. Freezing of ovarian tissue and clinical opportunities. <i>Reproduction</i> , 2019. | Narrative review |
| Asadi-Azarbaijani B, Sheikhi M, Nurmio M, Tinkanen H, Juvonen V, Dunkel L, Hovatta O, Oskam IC, Jahnukainen K. Minimal residual disease of leukemia and the quality of cryopreserved human ovarian tissue in vitro. <i>Leukemia & lymphoma</i> 2016;57: 700-707. | Paper does not address the key question (In vitro follicle culture and the influence of residual malignant cells) |
| Azem F, Hasson J, Ben-Yosef D, Kossoy N, Cohen T, Almog B, Amit A, Lessing JB, Lifschitz-Mercer B. Histologic evaluation of fresh human ovarian tissue before cryopreservation. <i>International journal of gynecological pathology : official journal of the International Society of Gynecological Pathologists</i> 2010;29: 19-23. | Included in review Bastings 2013 |
| Bath LE, Tydeman G, Critchley HO, Anderson RA, Baird DT, Wallace WH. Spontaneous conception in a young woman who had ovarian cortical tissue cryopreserved before chemotherapy and radiotherapy for a Ewing's sarcoma of the pelvis: case report. <i>Human reproduction</i> 2004;19: 2569-2572. | Case report |
| Bedaiwy MA, Shahin AY, Falcone T. Reproductive organ transplantation: advances and controversies. <i>Fertility and sterility</i> 2008;90: 2031-2055. | This review takes into account specific issues related to OTC and transplantation |
| Bertoldo MJ, Walters KA, Ledger WL, Gilchrist RB, Mermillod P, Locatelli Y. In-vitro regulation of primordial follicle activation: challenges for fertility preservation strategies. <i>Reproductive biomedicine online</i> 2018;36: 491-499. | Paper does not address the key question |
| Bhartiya D, Anand S, Parte S. VSEs may obviate cryobanking of gonadal tissue in cancer patients for fertility preservation. <i>Journal of ovarian research</i> 2015;8: 75. | Paper does not address the key question (ovarian stem cells) |
| Chen X. An explanation for the true origin of spontaneous pregnancies after subcutaneous ovarian transplantation. <i>Fertility and sterility</i> 2011;95: e50; author reply e51. | Author reply |
| Chiti MC, Donnez J, Andrade Amorim C, Dolmans MM. From isolation of human ovarian follicles to the artificial ovary: tips and tricks. <i>Minerva ginecologica</i> 2018. | Full text not available |
| Courbiere B, Prebet T, Mozziconacci MJ, Metzler-Guillermain C, Saias-Magnan J, Gannerre M. Tumor cell contamination in ovarian tissue cryopreserved before gonadotoxic treatment: should we systematically exclude ovarian autograft in a cancer survivor? <i>Bone marrow transplantation</i> 2010;45: 1247-1248. | Included in review Bastings 2013 |
| Demeestere I, Simon P, Englert Y, Delbaere A. Preliminary experience of ovarian tissue cryopreservation procedure: alternatives, perspectives and feasibility. <i>Reproductive biomedicine online</i> 2003;7: 572-579. | More recent reviews available |
| Dittrich R, Lotz L, Keck G, Hoffmann I, Mueller A, Beckmann MW, van der Ven H, Montag M. Live birth after ovarian tissue autotransplantation following overnight transportation before cryopreservation. <i>Fertility and sterility</i> 2012;97: 387-390. | Included in review Bastings 2013 |
| Dittrich R, Mueller A, Binder H, Oppelt PG, Renner SP, Goecke T, Hoffmann I, Beckmann WM. First retransplantation of cryopreserved ovarian tissue following cancer therapy in Germany. <i>Deutsches Arzteblatt international</i> 2008;105: 274-278. | Included in review Bastings 2013 |
| Dittrich R, Mueller A, Maltaris T, Hoffmann I, Magener A, Oppelt PG, Beckmann MW. Hormonal and histologic findings in human cryopreserved ovarian autografts. <i>Fertility and sterility</i> 2009;91: 1503-1506. | Included in review Bastings 2013 |
| Dolmans MM, Masciangolo R. Risk of transplanting malignant cells in cryopreserved ovarian tissue. <i>Minerva ginecologica</i> 2018. | Full text not available |
| Donnez J, Dolmans MM, Pirard C, Van Langendonck A, Demylle D, Jadoul P, Squifflet J. Allograft of ovarian cortex between two genetically non-identical sisters: case report. <i>Human reproduction (Oxford, England)</i> 2007;22: 2653-2659. | Case report of an heterologous OTG between twin sisters with compatible HLA |
| Donnez J, Dolmans MM. Cryopreservation of ovarian tissue: an overview. <i>Minerva medica</i> 2009;100: 401-413. | Full text not available |
| Donnez J, Dolmans MM. Transplantation of ovarian tissue. Best practice & research <i>Clinical obstetrics & gynaecology</i> 2014;28: 1188-1197. | Description of the different techniques, and the possibility of allografting in case of previous bone marrow transplantation |
| Donnez J, Squifflet J, Dolmans MM. Frozen-thawed ovarian tissue retransplants. <i>Seminars in reproductive medicine</i> 2009;27: 472-478. | Full text not available |
| Fleury, A., et al. Breast cancer and ovarian tissue cryopreservation: Review of the literature. <i>J Gynecol Obstet Hum Reprod</i> , 2018, 47(8): p. 351-357. | Narrative review |
| Gavish Z, Peer G, Roness H, Cohen Y, Meirou D. Follicle activation and 'burn-out' contribute to post-transplantation follicle loss in ovarian tissue grafts: the effect of graft thickness. <i>Human reproduction (Oxford, England)</i> 2015;30: 1003. | Experimental animal model (bovine) to assess how thickness of the ovarian tissue can influence follicular burnout |

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| Helpman L, Beiner ME, Aviel-Ronen S, Perri T, Hogen L, Jakobson-Setton A, Ben-Baruch G, Korach J. Safety of ovarian conservation and fertility preservation in advanced borderline ovarian tumors. <i>Fertility and sterility</i> 2015;104: 138-144. | Paper does not address the key question (fertility sparing surgery in ovarian cancer) |
| Helpman L, Yaniv A, Beiner ME, Aviel-Ronen S, Perri T, Ben-Baruch G, Hogen Ben-David L, Jakobson-Setton A, Korach J. Fertility preservation in women with borderline ovarian tumors - how does it impact disease outcome? A cohort study. <i>Acta obstetrica et gynecologica Scandinavica</i> 2017;96: 1300-1306. | Paper does not address the key question |
| Isachenko V, Isachenko E, Kreienberg R, Worieth M, Weiss J. Human ovarian tissue cryopreservation: quality of follicles as a criteria of effectiveness. <i>Reproductive biomedicine online</i> 2010;20: 441-442. | More relevant for vitrification vs slow freezing procedures |
| Jadoul P, Donnez J, Dolmans MM, Squifflet J, Lengele B, Martinez-Madrid B. Laparoscopic ovariectomy for whole human ovary cryopreservation: technical aspects. <i>Fertility and sterility</i> 2007;87: 971-975. | Technical aspects of the whole ovarian sampling |
| Janse F, Donnez J, Anckaert E, de Jong FH, Fauser BC, Dolmans MM. Limited value of ovarian function markers following orthotopic transplantation of ovarian tissue after gonadotoxic treatment. <i>The Journal of clinical endocrinology and metabolism</i> 2011;96: 1136-1144. | Included in review Bastings 2013 |
| Jeong K, Aslan E, Ozkaya E, Sonmezer M, Oktay K. Ovarian cryopreservation. <i>Minerva medica</i> 2012;103: 37-46. | Full text not available |
| Jeve, Y.B., T. Gelbaya, and M. Fatum, Time to consider ovarian tissue cryopreservation for girls with Turner's syndrome: an opinion paper. <i>Hum Reprod Open</i> , 2019. 2019(3): p. hoz2016. | Paper does not address the key question |
| Jia Y, Shi X, Xie Y, Xie X, Wang Y, Li S. Human umbilical cord stem cell conditioned medium versus serum-free culture medium in the treatment of cryopreserved human ovarian tissues in in-vitro culture: a randomized controlled trial. <i>Stem cell research & therapy</i> 2017;8. | Experimental study to test a new medium for in ovarian cortex vitro culture -> referred to another question |
| Kim SS, Battaglia DE, Soules MR. The future of human ovarian cryopreservation and transplantation: fertility and beyond. <i>Fertility and sterility</i> 2001;75: 1049-1056. | Included in review Bastings 2013 |
| Kim SS. Assessment of long term endocrine function after transplantation of frozen-thawed human ovarian tissue to the heterotopic site: 10 year longitudinal follow-up study. <i>Journal of assisted reproduction and genetics</i> 2012;29: 489-493. | Included in review Bastings 2013 |
| Kodama Y, Sameshima H, Ikenoue T, Ikeda T, Kawagoe Y. Successful fresh whole ovarian autotransplantation without vascular anastomosis. <i>Fertility and sterility</i> 2010;94: 2330.e2311-2332. | Case report of an emergency OTC |
| Kolp LA, Hubayter Z. Autotransplantation of cryopreserved ovarian tissue: a procedure with promise, risks, and a need for a registry. <i>Fertility and sterility</i> 2011;95: 1879-1886. | Included in review Bastings 2013 |
| Lambertini M, Kroman N, Ameye L, Cordoba O, Pinto A, Benedetti G, Jensen MB, Gelber S, Del Grande M, Ignatiadis M, de Azambuja E, Paesmans M, Peccatori FA, Azim HA Jr. Long-term Safety of Pregnancy Following Breast Cancer According to Estrogen Receptor Status. <i>J Natl Cancer Inst</i> . 2018 Apr 1;110(4):426-429. | Oncological outcomes after pregnancies in breast cancer survivors |
| Lu H, Li J, Wang L, Zhou H, Liu Y, Wang D, Lin Z. Is Ovarian Preservation Feasible in Early-Stage Adenocarcinoma of the Cervix? <i>Medical science monitor : international medical journal of experimental and clinical research</i> 2016;22: 408-414. | Paper does not address the key question (fertility sparing surgery) |
| Macklon KT, Ernst E, Andersen AN, Andersen CY. Cryobanking of human ovarian tissue: Do women still want their tissue stored beyond 5 years? <i>Reproductive biomedicine online</i> 2014;29: 452-456. | Paper does not address the key question (patient's perspective) |
| Macklon, K.T., Prevalence of deaths in a cohort of girls and women with cryopreserved ovarian tissue. <i>Acta Obstet Gynecol Scand</i> , 2019. 98(5): p. 625-629. | Paper does not address the key question |
| Mayerhofer K, Ott J, Nouri K, Stoegbauer L, Fischer EM, Lipovac M, Promberger R, Huber JC. Laparoscopic ovarian tissue harvesting for cryopreservation: an effective and safe procedure for fertility preservation. <i>European journal of obstetrics, gynecology, and reproductive biology</i> 2010;152: 68-72. | Paper does not address the key question (safety aspects of tissue harvesting) |
| Meirow D, Hardan I, Dor J, Fridman E, Elizur S, Ra'anani H, Styusarevsky E, Amarioglio N, Schiff E, Rechavi G et al. Searching for evidence of disease and malignant cell contamination in ovarian tissue stored from hematologic cancer patients. <i>Human reproduction</i> 2008;23: 1007-1013. | Included in review Bastings 2013 |
| Mhatre P, Mhatre J, Magotra R. Ovarian transplant: a new frontier. <i>Transplantation proceedings</i> 2005;37: 1396-1398. | Full text not available |
| Morewood T, Getreu N, Fuller B, Morris J, Hardiman P. The effect of thawing protocols on follicle conservation in human ovarian tissue cryopreservation. <i>Cryo letters</i> 2017;38: 137-144. | Full text not available |
| Nakamura Y, Obata R, Okuyama N, Aono N, Hashimoto T, Kyono K. Residual ethylene glycol and dimethyl sulphoxide concentration in human ovarian tissue during warming/thawing steps following cryopreservation. <i>Reproductive biomedicine online</i> 2017;35: 311-313. | Paper does not address the key question |
| Oktay K, Buyuk E, Veeck L, Zaninovic N, Xu K, Takeuchi T, Opsahl M, Rosenwaks Z. Embryo development after heterotopic transplantation of cryopreserved ovarian tissue. <i>Lancet</i> 2004;363: 837-840. | Included in review Bastings 2013 |
| Oktay K, Economos K, Kan M, Rucinski J, Veeck L, Rosenwaks Z. Endocrine function and oocyte retrieval after autologous transplantation of ovarian cortical strips to the forearm. <i>Jama</i> 2001;286: 1490-1493. | Case report (2 patients having had an ovarian tissue transplantation in the forearm and had revored their menstrual cycle) |
| Olsthoorn-Heim E, de Wert G. Ovarian tissue cryopreservation: promises and uncertainties. <i>European journal of health law</i> 2009;16: 173-183. | Normative questions on OTC -> referred to another question |
| Ott J, Nouri K, Stogbauer L, Fischer EM, Lipovac M, Promberger R, Huber JC, Mayerhofer K. Ovarian tissue cryopreservation for non-malignant indications. <i>Archives of gynecology and obstetrics</i> 2010;281: 735-739. | Retrospective cohort of 7 patients undergoing OTC for benign diseases -> referred to another question |
| Ovarian tissue and oocyte cryopreservation. <i>Fertility and sterility</i> 2006;86: S142-147. | |

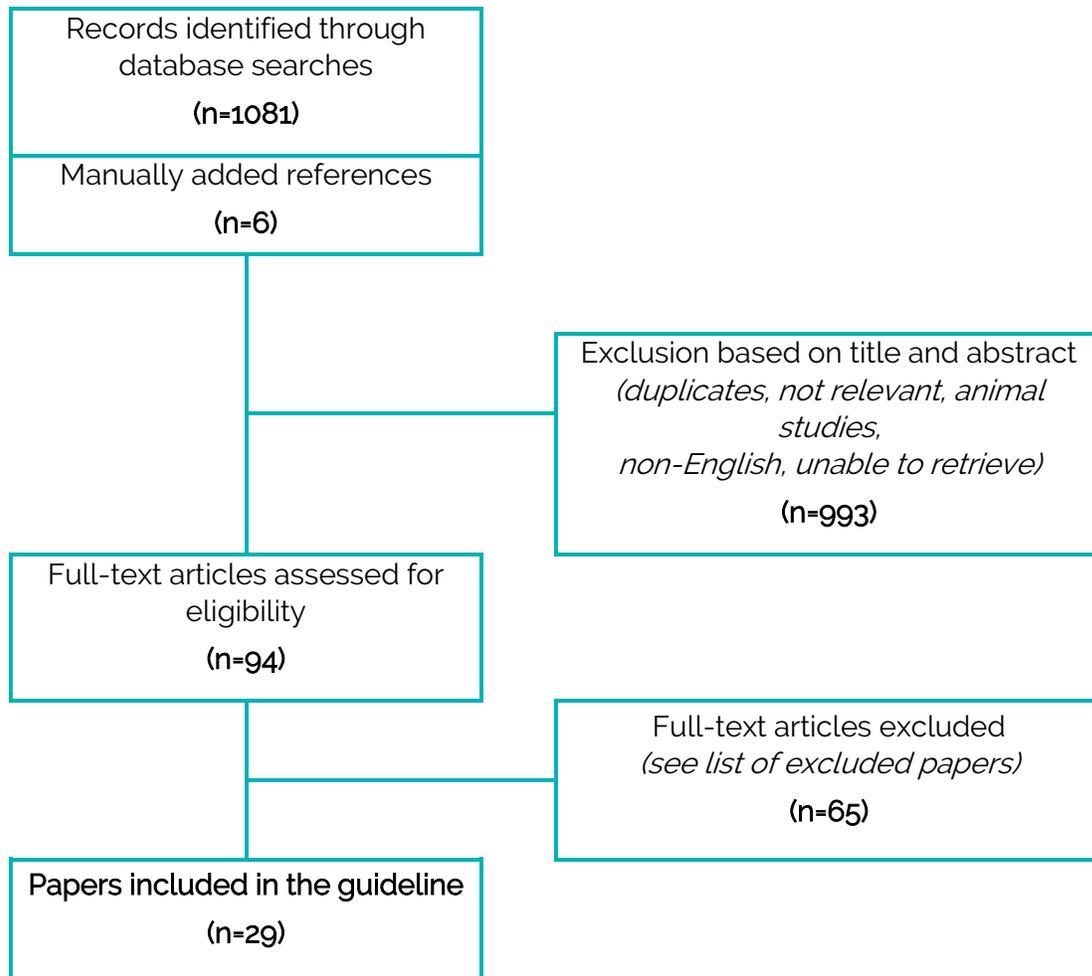
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|---|---|
| Ovarian tissue cryopreservation and transplantation among alternatives for fertility preservation in the Nordic countries - compilation of 20 years of multicenter experience. <i>Acta obstetrica ET gynecologica scandinavica</i> 95 (9) (pp 1015-1026), 2016 Date of publication: 01 sep 2016 2016. | complication is not the primary questioned topic |
| Pavone ME, Hirshfeld-Cytron J, Tingen C, Thomas C, Thomas J, Lowe MP, Schink JC, Woodruff TK. Human ovarian tissue cortex surrounding benign and malignant lesions. <i>Reproductive sciences</i> 2014;21: 582-589. | Study does not address the key question (Monocentric study on ovarian reserve in pathology after an ovariectomy for oncological or non oncological reasons) |
| Pereira N, Hubschmann AG, Lekovich JP, Schattman GL, Rosenwaks Z. Ex vivo retrieval and cryopreservation of oocytes from oophorectomized specimens for fertility preservation in a BRCA1 mutation carrier with ovarian cancer. <i>Fertility and sterility</i> 2017;108: 357-360. | Paper does not address the key question |
| Rodriguez-Wallberg KA, Karlstrom PO, Rezapour M, Castellanos E, Hreinsson J, Rasmussen C, Sheikhi M, Ouvrier B, Bozoky B, Olofsson JI et al. Full-term newborn after repeated ovarian tissue transplants in a patient treated for Ewing sarcoma by sterilizing pelvic irradiation and chemotherapy. <i>Acta obstetrica et gynecologica Scandinavica</i> 2015;94: 324-328. | Case report |
| Rosendahl M, Andersen CY, Ernst E, Westergaard LG, Rasmussen PE, Loft A, Andersen AN. Ovarian function after removal of an entire ovary for cryopreservation of pieces of cortex prior to gonadotoxic treatment: a follow-up study. <i>Human reproduction (Oxford, England)</i> 2008;23: 2475-2483. | Prospective follow-up of patients having undergone OCT for oncological reasons -> referred to another question |
| Rosendahl M, Greve T, Andersen CY. The safety of transplanting cryopreserved ovarian tissue in cancer patients: a review of the literature. <i>Journal of assisted reproduction and genetics</i> 2013;30: 11-24. | A more recent review is available |
| Ruan, X, Chinese Society of Gynecological Endocrinology affiliated to the International Society of Gynecological Endocrinology Guideline for Ovarian Tissue Cryopreservation and Transplantation. <i>Gynecol Endocrinol</i> , 2018. 34(12): p. 1005-1010. | Guideline |
| Salama M, Woodruff TK. New advances in ovarian autotransplantation to restore fertility in cancer patients. <i>Cancer metastasis reviews</i> 2015;34: 807-822. | State of the art of OTT. Review mainly considers guidelines and other reviews |
| Sanchez M, Alama P, Gadea B, Soares SR, Simon C, Pellicer A. Fresh human orthotopic ovarian cortex transplantation: long-term results. <i>Human reproduction (Oxford, England)</i> 2007;22: 786-791. | Orthotopic transplantation of fresh ovarian tissue - not discussed |
| Schmidt KL, Andersen CY, Loft A, Byskov AG, Ernst E, Andersen AN. Follow-up of ovarian function post-chemotherapy following ovarian cryopreservation and transplantation. <i>Human reproduction (Oxford, England)</i> 2005;20: 3539-3546. | Included in review Bastings 2013 |
| Schmidt KT, Nyboe Andersen A, Greve T, Ernst E, Loft A, Yding Andersen C. Fertility in cancer patients after cryopreservation of one ovary. <i>Reproductive biomedicine online</i> 2013;26: 272-279. | Paper does not address the key question |
| Siebzehnruhl E. Cryopreservation of ovarian tissue to preserve female fertility - state of the art. <i>Andrologia</i> 2003;35: 180-181. | More recent reviews available |
| Silber S, Pineda J, Lenahan K, DeRosa M, Melnick J. Fresh and cryopreserved ovary transplantation and resting follicle recruitment. <i>Reproductive biomedicine online</i> 2015;30: 643-650. | Paper does not address the key question (Description on the recovery of ovarian function and on the efficacy of the technique on 22 patients having had ovarian tissue transplantation) |
| Sorensen SD, Greve T, Wielenga VT, Wallace WH, Andersen CY. Safety considerations for transplanting cryopreserved ovarian tissue to restore fertility in female patients who have recovered from Ewing's sarcoma. <i>Future oncology</i> 2014;10: 277-283. | Full text not available |
| Wallace WH, Kelsey TW, Anderson RA. Ovarian cryopreservation: experimental or established and a cure for the menopause? <i>Reproductive biomedicine online</i> 2012;25: 93-95. | Narrative review including further developments |
| Wallace WH, Pritchard J. Livebirth after cryopreserved ovarian tissue autotransplantation. <i>Lancet</i> 2004;364: 2093-2094. | Included in review Bastings 2013 |
| Yang Y, Cheung HH, Law WN, Zhang C, Chan WY, Pei X, Wang Y. New Insights into the Role of Autophagy in Ovarian Cryopreservation by Vitrification. <i>Biology of reproduction</i> 2016;94: 137. | Paper does not address the key question (Role of autophagy in follicular depletion when vitrification is used) |
| Yding Andersen C, Ernst E, Baerentzen S, Birkebaek NH, Clausen N. No malignancy detected in surplus ovarian tissue from a former Ewing sarcoma patient who experienced relapse four years after being grafted with frozen/thawed ovarian tissue. <i>Journal of assisted reproduction and genetics</i> 2014;31: 1567-1568. | Case report |
| Zver T, Alvergnas-Vieille M, Garnache-Ottou F, Roux C, Amiot C. A new method for evaluating the risk of transferring leukemic cells with transplanted cryopreserved ovarian tissue. <i>Journal of assisted reproduction and genetics</i> 2015;32: 1263-1266. | Technical aspects (Leukemic cells detection method) |

Q16 Should In vitro maturation (IVM) vs. no intervention be used for fertility preservation?

Search strings

| DATABASE | Search string |
|------------------------------------|---|
| PUBMED MERGED SEARCH TERM | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassaemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis" OR "Transgender Persons"[Mesh] OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR ("Fertility Preservation"[Mesh] OR "Fertility Preservation") AND ("In Vitro Oocyte Maturation Techniques"[Mesh] OR "In Vitro Maturation" OR "ex vivo maturation" OR "Ex vivo IVM") |
| COCHRANE MERGED | (Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis" OR "Transgender Persons" OR Transgender OR Transsexual OR "anticipated gamete exhaustion" OR "age-related fertility decline" OR "social freezing" OR "nonmedical freezing" OR "social egg-freezing" OR "Elective freezing" OR "Fertility Preservation") AND ("In Vitro Oocyte Maturation Techniques" OR "In Vitro Maturation" OR "ex vivo maturation" OR "Ex vivo IVM") |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|---|--|
| Virant-Klun I, Bauer C, Stahlberg A, Kubista M, Skutella T. Human oocyte maturation in vitro is improved by co-culture with cumulus cells from mature oocytes. <i>Reproductive biomedicine online</i> 2018;36: 508-523. | Relevant patients/intervention not included |
| Yang ZY, Chian RC. Development of in vitro maturation techniques for clinical applications. <i>Fertility and sterility</i> 2017;108: 577-584. | Relevant patients/intervention not included |
| Zhang Z, Wang T, Hao Y, Panhwar F, Chen Z, Zou W, Ji D, Chen B, Zhou P, Zhao G et al. Effects of trehalose vitrification and artificial oocyte activation on the development competence of human immature oocytes. <i>Cryobiology</i> 2017;74: 43-49. | Relevant patients/intervention not included |
| Ben-Haroush A, Abir R, Sapir O, Garor R, Fisch B. Aspiration of immature oocytes during cesarean section for fertility preservation. <i>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</i> 2017;30: 2112-2114. | Relevant patients/intervention not included |
| Sifer C, Sellam-Chokron O, Sermondade N, Cedrin-Dumerin I, Sonigo C, Herbemont C, Grynberg M. Should metaphase 1 and 2 stages oocytes be vitrified in the same time for fertility preservation? <i>Future oncology (London, England)</i> 2016;12: 2297-2305. | Relevant patients/intervention not included |
| Robertson DM, Gilchrist RB, Ledger WL, Baerwald A. Random start or emergency IVF/in vitro maturation: a new rapid approach to fertility preservation. <i>Women's health (London, England)</i> 2016;12: 339-349. | Relevant outcomes are not (appropriately) assessed |
| Phoon W, Olofsson J, Barbunopulos L, Menezes J, Tohonen V, Rodriguez-Wallberg K. Exploring the fertility potential of GV-retrieved oocytes for future fertility preservation. <i>Human reproduction Conference: 32nd annual meeting of the ESHRE Finland</i> 2016;31: i338. | Conference abstract |
| Sonigo C, Seroka A, Cedrin-Dumerin I, Sermondade N, Sifer C, Grynberg M. History of ABVD alters the number of oocytes vitrified after in vitro maturation in fertility preservation candidates. <i>Future oncology (London, England)</i> 2016;12: 1713-1719. | Publication type : Editorial |
| Li HJ, Sutton-McDowall ML, Wang X, Sugimura S, Thompson JG, Gilchrist RB. Extending prematuration with cAMP modulators enhances the cumulus contribution to oocyte antioxidant defence and oocyte quality via gap junctions. <i>Human reproduction</i> 2016;31: 810-821. | Relevant patients/intervention not included |
| Pires-Luis AS, Rocha E, Bartosch C, Oliveira E, Silva J, Barros A, Sa R, Sousa M. A stereological study on organelle distribution in human oocytes at prophase I. <i>Zygote</i> 2016;24: 346-354. | Relevant patients/intervention not included |
| Plushch G, Schneider E, Schneider T, El Hajj N, Rosner S, Strowitzki T, Haaf T. In vitro maturation of oocytes is not associated with altered deoxyribonucleic acid methylation patterns in children from in vitro fertilization or intracytoplasmic sperm injection. <i>Fertility and sterility</i> 2015;103: 720-727.e721. | Relevant patients/intervention not included |
| Lee JA, Sekhon L, Grunfeld L, Copperman AB. In-vitro maturation of germinal vesicle and metaphase I eggs prior to cryopreservation optimizes reproductive potential in patients undergoing fertility preservation. <i>Current opinion in obstetrics & gynecology</i> 2014;26: 168-173. | Relevant patients/intervention not included |
| Adhikari D. In vitro activation of dormant follicles for fertility preservation. <i>Advances in experimental medicine and biology</i> 2013;761: 29-42. | Relevant intervention not included |
| Liebenthron J, Koster M, Drengrer C, Reinsberg J, van der Ven H, Montag M. The impact of culture conditions on early follicle recruitment and growth from human ovarian cortex biopsies in vitro. <i>Fertility and sterility</i> 2013;100: 483-491.e485. | Not relevant for this key question |
| Imesch P, Scheiner D, Xie M, Fink D, Macas E, Dubey R, Imthurn B. Developmental potential of human oocytes matured in vitro followed by vitrification and activation. <i>Journal of ovarian research</i> 2013;6: 30. | Small case series with suboptimal protocol |
| Lee JA, Barritt J, Moschini RM, Slifkin RE, Copperman AB. Optimizing human oocyte cryopreservation for fertility preservation patients: should we mature then freeze or freeze then mature? <i>Fertility and sterility</i> 2013;99: 1356-1362. | Relevant patients/intervention not included |
| Berwanger AL, Finet A, El Hachem H, le Parco S, Hesters L, Grynberg M. New trends in female fertility preservation: in vitro maturation of oocytes. <i>Future oncology</i> 2012;8: 1567-1573. | Narrative review |
| Fabbri R, Pasquinelli G, Parazza I, Macciocca M, Magnani V, Battaglia C, Paradisi R, Venturoli S. Effects of cyclic increase in gonadotropins on the in vitro development of primordial follicles to antral stage. <i>Ultrastructural pathology</i> 2012;36: 356-361. | Relevant patients/intervention not included |
| Wang H, Racowsky C, Combelles CM. Is it best to cryopreserve human cumulus-free immature oocytes before or after in vitro maturation? <i>Cryobiology</i> 2012;65: 79-87. | Relevant patients/intervention not included |
| Smitz JE, Thompson JG, Gilchrist RB. The promise of in vitro maturation in assisted reproduction and fertility preservation. <i>Seminars in reproductive medicine</i> 2011;29: 24-37. | Relevant patients/intervention not included |
| Ata B, Shalom-Paz E, Chian RC, Tan SL. In vitro maturation of oocytes as a strategy for fertility preservation. <i>Clinical obstetrics and gynecology</i> 2010;53: 775-786. | Relevant patients/intervention not included |
| Oktay K, Buyuk E, Rodriguez-Wallberg KA, Sahin G. In vitro maturation improves oocyte or embryo cryopreservation outcome in breast cancer patients undergoing ovarian stimulation for fertility preservation. <i>Reproductive biomedicine online</i> 2010;20: 634-638. | Relevant patients/intervention not included |
| Martins WP, Nastri CO, Reis RM, Ferriani RA. Endometrial preparation for in vitro maturation treatment. <i>Fertility and sterility</i> 2010;93: e6; author reply e7. | Relevant patients/intervention not included |
| Son WY, Chung JT, Gidoni Y, Holzer H, Levin D, Chian RC, Tan SL. Comparison of survival rate of cleavage stage embryos produced from in vitro maturation cycles after slow freezing and after vitrification. <i>Fertility and sterility</i> 2009;92: 956-958. | Relevant patients/intervention not included |
| Oktay K, Demirtas E, Son WY, Lostritto K, Chian RC, Tan SL. In vitro maturation of germinal vesicle oocytes recovered after premature luteinizing hormone surge: description of a novel approach to fertility preservation. <i>Fertility and sterility</i> 2008;89: 228.e219-222. | Relevant patients/intervention not included |
| Hashimoto S, Fukuda A, Murata Y, Kikawa M, Oku H, Kanaya H, Sonoda M, Sugihara K, Murata T, Nagata F et al. Effect of aspiration vacuum on the developmental competence of immature human oocytes retrieved using a 20-gauge needle. <i>Reproductive biomedicine online</i> 2007;14: 444-449. | Relevant patients/intervention not included |

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| Huang JY, Buckett WM, Gilbert L, Tan SL, Chian RC. Retrieval of immature oocytes followed by in vitro maturation and vitrification: a case report on a new strategy of fertility preservation in women with borderline ovarian malignancy. <i>Gynecologic oncology</i> 2007;105: 542-544. | Relevant patients/intervention not included |
| Abir R, Nitke S, Ben-Haroush A, Fisch B. In vitro maturation of human primordial ovarian follicles: clinical significance, progress in mammals, and methods for growth evaluation. <i>Histology and histopathology</i> 2006;21: 887-898. | Relevant patients/intervention not included |
| Gosden RG. Prospects for oocyte banking and in vitro maturation. <i>Journal of the National Cancer Institute Monographs</i> 2005: 60-63. | Relevant patients/intervention not included |
| Beerendonk CC, Braat DD. Present and future options for the preservation of fertility in female adolescents with cancer. <i>Endocrine development</i> 2005;8: 166-175. | Outdated |
| Child TJ, Gulekli B, Sylvestre C, Tan SL. Ultrasonographic assessment of endometrial receptivity at embryo transfer in an in vitro maturation of oocyte program. <i>Fertility and sterility</i> 2003;79: 656-658. | Relevant patients/intervention not included |
| Wu J, Zhang L, Wang X. In vitro maturation, fertilization and embryo development after ultrarapid freezing of immature human oocytes. <i>Reproduction (Cambridge, England)</i> 2001;121: 389-393. | Outdated |
| Chng MW, Lau MS, Chan M, Tan HH, Nadarajah S. Overnight maturation of a metaphase I oocyte retrieved from a natural cycle using human tubular fluid: a case report. <i>Journal of assisted reproduction and genetics</i> 2013;30: 77-79. | Relevant patients/intervention not included |
| Reichman DE, Davis OK, Zaninovic N, Rosenwaks Z, Goldschlag DE. Fertility preservation using controlled ovarian hyperstimulation and oocyte cryopreservation in a premenarcheal female with myelodysplastic syndrome. <i>Fertility and sterility</i> 2012;98: 1225-1228. | Relevant patients/intervention not included |
| Sato C, Shimada M, Mori T, Kumasako Y, Otsu E, Watanabe H, Utsunomiya T. Assessment of human oocyte developmental competence by cumulus cell morphology and circulating hormone profile. <i>Reproductive biomedicine online</i> 2007;14: 49-56. | Relevant patients/intervention not included |
| Kristensen SG, Pors SE, Andersen CY. Improving oocyte quality by transfer of autologous mitochondria from fully grown oocytes. <i>Human reproduction (Oxford, England)</i> 2017;32: 725-732. | Relevant patients/intervention not included |
| Safian F, Khalili MA, Karimi-Zarchi M, Mohsenzadeh M, Ashourzadeh S, Omid M. Developmental competence of immature oocytes aspirated from antral follicles in patients with gynecological diseases. <i>Iranian journal of reproductive medicine</i> 2015;13: 507-512. | Relevant outcomes are not (appropriately) assessed |
| Palmerini MG, Antinori M, Maione M, Cerusico F, Versaci C, Nottola SA, Macchiarelli G, Khalili MA, Antinori S. Ultrastructure of immature and mature human oocytes after cryotop vitrification. <i>The Journal of reproduction and development</i> 2014;60: 411-420. | Relevant outcomes are not (appropriately) assessed |
| Telfer EE, Zelinski MB. Ovarian follicle culture: advances and challenges for human and nonhuman primates. <i>Fertility and sterility</i> 2013;99: 1523-1533. | Narrative review |
| Kim JY. Control of ovarian primordial follicle activation. <i>Clinical and experimental reproductive medicine</i> 2012;39: 10-14. | Not relevant for the key question |
| Dahoun, M., et al., Does oxygen tension influence in vitro maturation of human, oocytes in a fertility preservation program? Preliminary results of a, prospective auto-controlled study. <i>Human reproduction (Oxford, England)</i> , 2018. 33: p. 1372-1373. | Conference abstract |
| Hart, R.J., Optimizing the opportunity for female fertility preservation in a limited time-frame for patients with cancer using in vitro maturation and ovarian tissue cryopreservation. <i>Fertil Steril</i> , 2019. 111(2): p. 258-259. | Opinion paper |
| Mohsenzadeh, M., et al., Vitrification has detrimental effects on maturation, viability, and subcellular quality of oocytes post IVM in cancerous women: An experimental study. <i>Int J Reprod Biomed (Yazd)</i> , 2019. 17(3). | Few data with large range of patients age . low impact |
| Sanchez, F., et al., Biphasic in vitro maturation (CAPA-IVM) specifically improves the developmental capacity of oocytes from small antral follicles. <i>J Assist Reprod Genet</i> , 2019. 36(10): p. 2135-2144. | Relevant patients are not included |
| Saenz-de-Juano, M.D., et al., DNA methylation and mRNA expression of imprinted genes in blastocysts derived from an improved in vitro maturation method for oocytes from small antral follicles in polycystic ovary syndrome patients. <i>Hum Reprod</i> , 2019. 34(9): p. 1640-1649. | Relevant patients are not included |
| Roesner, S., et al., Successful in vitro maturation for urgent fertility preservation despite hormonal contraception by continuous progesterin application. <i>Gynecol Endocrinol</i> , 2019. 35(4): p. 298-300. | Case report |
| Yang, S.H., et al., Improvement of embryonic development and clinical outcomes of germinal vesicle stage oocytes using a microvibration culture system. <i>Syst Biol Reprod Med</i> , 2019. 65(4): p. 333-341. | Relevant patients are not included |
| Fabbrì, R., et al., Update on oogenesis in vitro. <i>Minerva Ginecol</i> , 2018. 70(5): p. 588-608. | Review |
| Karavani, G., et al., In vitro maturation rates in young premenarche patients. <i>Fertil Steril</i> , 2019. 112(2): p. 315-322. | Relevant patients are not included |
| Ata B, Chian RC, Tan SL. Cryopreservation of oocytes and embryos for fertility preservation for female cancer patients. <i>Best practice & research Clinical obstetrics & gynaecology</i> 2010;24: 101-112. | Narrative review |
| Azem F, Hasson J, Cohen T, Shwartz T, Mey-Raz N, Almog B, Amit A, Ben-Yosef D. Retrieval of immature oocytes after chemotherapy for Hodgkin's disease and prolonged ovarian down-regulation with gonadotropin-releasing hormone agonist. <i>Fertility and sterility</i> 2009;92: 828.e821-822. | Case report |
| Brambillasca F, Guglielmo MC, Coticchio G, Mignini Renzini M, Dal Canto M, Fadini R. The current challenges to efficient immature oocyte cryopreservation. <i>Journal of assisted reproduction and genetics</i> 2013;30: 1531-1539. | Narrative review on the effect of freezing on oocyte quality |
| Cao YX, Chian RC. Fertility preservation with immature and in vitro matured oocytes. <i>Seminars in reproductive medicine</i> 2009;27: 456-464. | Narrative review |
| Chian RC, Uzelac PS, Nargund G. In vitro maturation of human immature oocytes for fertility preservation. <i>Fertility and sterility</i> 2013;99: 1173-1181. | Narrative review |
| Das M, Shehata F, Son WY, Tulandi T, Holzer H. Ovarian reserve and response to IVF and in vitro maturation treatment following chemotherapy. <i>Human reproduction</i> 2012;27: 2509-2514. | IVM treatment after chemotherapy (not FP) |
| Fadini R, Dal Canto M, Mignini Renzini M, Milani R, Fruscio R, Cantu MG, Brambillasca F, Coticchio G. Embryo transfer following in vitro maturation and cryopreservation of oocytes recovered from | Case report |

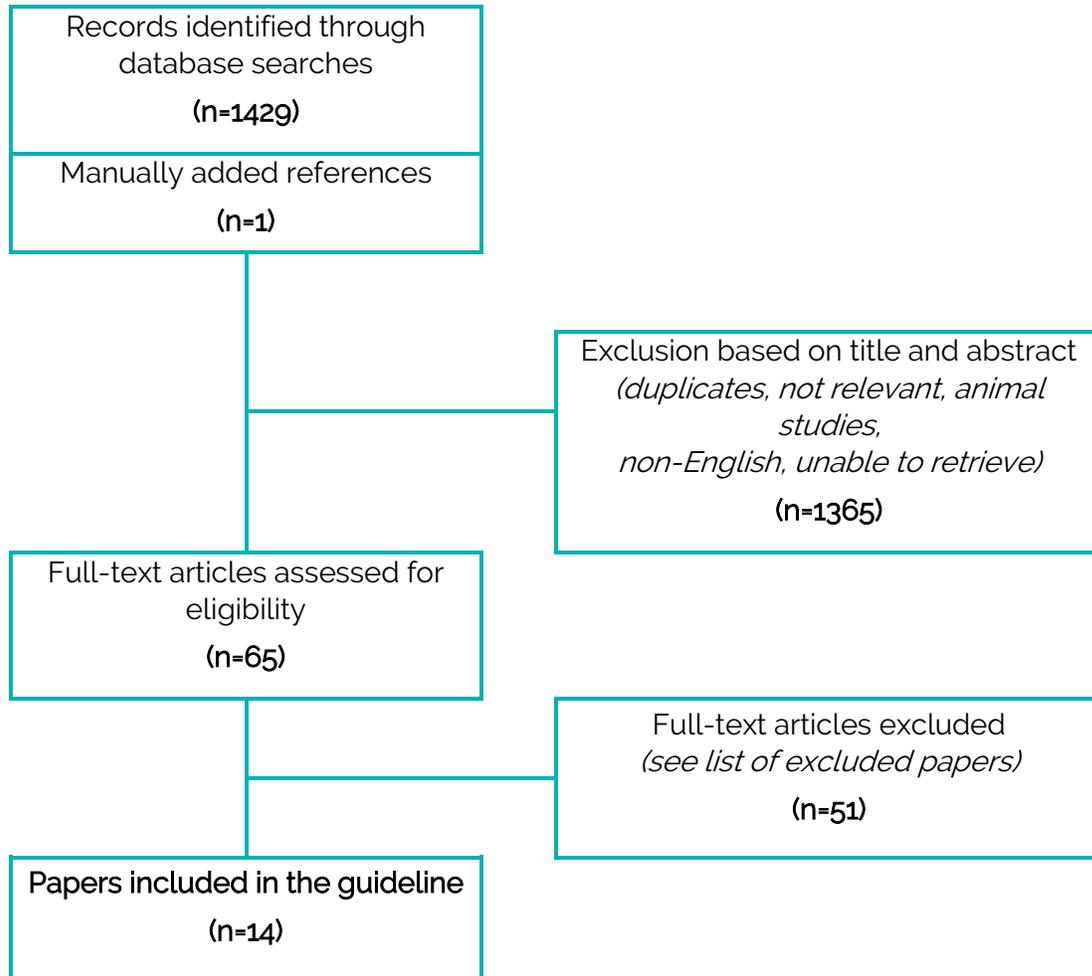
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| antral follicles during conservative surgery for ovarian cancer. <i>Journal of assisted reproduction and genetics</i> 2012;29: 779-781. | |
| Huang JY, Chian RC, Gilbert L, Fleischer D, Holzer H, Dermatas E, Elizur SE, Gidoni Y, Levin D, Son WY et al. Retrieval of immature oocytes from unstimulated ovaries followed by in vitro maturation and vitrification: A novel strategy of fertility preservation for breast cancer patients. <i>American journal of surgery</i> 2010;200: 177-183. | Paper does not provide relevant information to answer the key question |
| Mohsenzadeh M, Khalili MA, Tabibnejad N, Yari N, Agha-Rahimi A, Karimi-Zarchi M. Embryo Cryopreservation Following In-Vitro Maturation for Fertility Preservation in a Woman with Mullerian Adenosarcoma: A Case Report. <i>Journal of human reproductive sciences</i> 2017;10: 138-141. | Case report |
| Molina I, Gomez J, Balasch S, Pellicer N, Novella-Maestre E. Osmotic-shock produced by vitrification solutions improves immature human oocytes in vitro maturation. <i>Reproductive biology and endocrinology : RB&E</i> 2016;14: 27. | Low quality study |
| Park CW, Lee SH, Yang KM, Lee IH, Lim KT, Lee KH, Kim TJ. Cryopreservation of in vitro matured oocytes after ex vivo oocyte retrieval from gynecologic cancer patients undergoing radical surgery. <i>Clinical and experimental reproductive medicine</i> 2016;43: 119-125. | Small case series, more relevant data available |
| Revel A, Revel-Vilk S, Aizenman E, Porat-Katz A, Safran A, Ben-Meir A, Weintraub M, Shapira M, Achache H, Laufer N. At what age can human oocytes be obtained? <i>Fertility and sterility</i> 2009;92: 458-463. | Few patients, pubertal girls |
| Shalom-Paz E, Almog B, Shehata F, Huang J, Holzer H, Chian RC, Son WY, Tan SL. Fertility preservation for breast-cancer patients using IVM followed by oocyte or embryo vitrification. <i>Reproductive biomedicine online</i> 2010;21: 566-571. | Paper does not provide information to answer the key question |
| Shirasawa H, Kumagai J, Sato W, Kumazawa Y, Sato N, Terada Y. Retrieval and in vitro maturation of human oocytes from ovaries removed during surgery for endometrial carcinoma: a novel strategy for human oocyte research. <i>Journal of assisted reproduction and genetics</i> 2013;30: 1227-1230. | Small case series that does not report on results from embryo transfer |
| Shirasawa H, Kumazawa Y, Sato W, Ono N, Terada Y. In vitro maturation and cryopreservation of oocytes retrieved from intra-operative aspiration during second enucleation for ovarian tumor: A case report. <i>Gynecologic oncology reports</i> 2017;19: 1-4. | Case report |
| Shirasawa H, Terada Y. In vitro maturation of human immature oocytes for fertility preservation and research material. <i>Reproductive medicine and biology</i> 2017;16: 258-267. | Narrative review |

Q17 Should GnRH agonists vs. no treatment be used for ovarian protection in patients undergoing gonadotoxic treatment?

Search strings

| DATABASE | Search string |
|------------------|--|
| PUBMED MERGED | ("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis") AND ("Gonadotropin-Releasing Hormone Agonist" OR GnRH agonists OR Triptorelin OR buserelin OR goserelin OR diphereline OR "leuprolide acetate" OR GnRHa) AND ("ovarian suppression" OR "ovarian protection" OR chemotherapy) NOT (prostate OR tamoxifen OR myoma OR fibroids) |
| COCHRANE | (Cancer OR tumor OR neoplasm OR malignancy OR neoplasms OR "Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis") AND ("Gonadotropin-Releasing Hormone Agonist" OR GnRH agonists OR Triptorelin OR buserelin OR goserelin OR diphereline OR "leuprolide acetate" OR GnRHa) AND ("ovarian suppression" OR "ovarian protection" OR chemotherapy) NOT (prostate OR tamoxifen OR myoma OR fibroids) |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|---|--|
| Bai F, Lu Y, Wu K, Chen Q, Ding L, Ge M, Weng Z. Protecting Effects of Gonadotropin-Releasing Hormone Agonist on Chemotherapy-Induced Ovarian Damage in Premenopausal Breast Cancer Patients: A Systematic Review and Meta-Analysis. <i>Breast Care (Basel)</i> 2017;12: 48-52. | All the RCTs were included in a meta-analysis (Lambertini 2018) |
| Bansal A, Patel FD, Rai B, Dhanireddy B, Sharma SC. Gonadotrophin releasing hormone analogues for ovarian function preservation in young females undergoing chemotherapy. <i>Asian Pac J Cancer Prev</i> 2014;15: 2185-2190. | Narrative/systematic review of studies already included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Beyer DA, Amari F, Thill M, Schultze-Mosgau A, Al-Hasani S, Diedrich K, Griesinger G. Emerging gonadotropin-releasing hormone agonists. <i>Expert Opin Emerg Drugs</i> 2011;16: 323-340. | Narrative review discussing use of GnRH-a for medical purposes; studies already included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Blumenfeld Z, Evron A. Endocrine prevention of chemotherapy-induced ovarian failure. <i>Curr Opin Obstet Gynecol</i> 2016;28: 223-229. | Narrative review discussing studies already included in meta-analyses (Lambertini 2018 & Senra 2018) |
| Blumenfeld Z, Evron A. Preserving fertility when choosing chemotherapy regimens - the role of gonadotropin-releasing hormone agonists. <i>Expert Opin Pharmacother</i> 2015;16: 1009-1020. | Narrative review discussing studies already included in meta-analyses (Lambertini 2018 & Senra 2018) |
| Chen H, Li J, Cui T, Hu L. Adjuvant gonadotropin-releasing hormone analogues for the prevention of chemotherapy induced premature ovarian failure in premenopausal women. <i>Cochrane Database Syst Rev</i> 2011: Cd008018. | All the RCTs were included in other larger meta-analyses (Lambertini 2018 & Senra 2018) |
| Cigni A, Faedda R, Atzeni MM, Pileri PV, Alagna S, Rovasio P, Satta AE, Loi MR, Sini A, Satta V et al. Hormonal strategies for fertility preservation in patients receiving cyclophosphamide to treat glomerulonephritis: a nonrandomized trial and review of the literature. <i>Am J Kidney Dis</i> 2008;52: 887-896. | Included in meta-analysis by Ben-Aharon 2010 |
| Cima LN, Colita A, Fica S. Perspectives on the co-treatment with GnRH-a in female patients undergoing hematopoietic stem cell transplantation. <i>Endocr Connect</i> 2017;6: R162-r170. | Narrative review discussing studies already included in meta-analyses (Lambertini 2018 & Senra 2018) |
| Cui, W., et al., Preventing ovarian failure associated with chemotherapy. <i>Med J Aust</i> , 2018. 209(9): p. 412-416. | Narrative review discussing studies already included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Del Mastro L, Ceppi M, Poggio F, Bighin C, Peccatori F, Demeestere I, Levaggi A, Giraudi S, Lambertini M, D'Alonzo A et al. Gonadotropin-releasing hormone analogues for the prevention of chemotherapy-induced premature ovarian failure in cancer women: systematic review and meta-analysis of randomized trials. <i>Cancer Treat Rev</i> 2014;40: 675-683. | All the RCTs were included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Elgindy EA, El-Haieg DO, Khorshid OM, Ismail EI, Abdelgawad M, Sallam HN, Abou-Setta AM. Gonadotrophin suppression to prevent chemotherapy-induced ovarian damage: a randomized controlled trial. <i>Obstet Gynecol</i> 2013;121: 78-86. | RCT already included in the meta-analysis by Lambertini 2018 |
| Hickman LC, Larena NC, Valentine LN, Liu X, Falcone T. Preservation of gonadal function in women undergoing chemotherapy: a systematic review and meta-analysis of the potential role for gonadotropin-releasing hormone agonists. <i>J Assist Reprod Genet</i> 2018;35: 571-581. | All the RCTs were included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Karimi-Zarchi M, Forat-Yazdi M, Vafaenasab MR, Nakhaie-Moghadam M, Miratashi-Yazdi A, Teimoori S, Dehghani-Tafti A. Evaluation of the effect of GnRH agonist on menstrual reverse in breast cancer cases treated with cyclophosphamide. <i>Eur J Gynaecol Oncol</i> 2014;35: 59-61. | RCT already included in the meta-analysis by Lambertini 2018 |
| Karlsson P, Sun Z, Braun D, Price KN, Castiglione-Gertsch M, Rabaglio M, Gelber RD, Crivellari D, Collins J, Murray E et al. Long-term results of International Breast Cancer Study Group Trial VIII: adjuvant chemotherapy plus goserelin compared with either therapy alone for premenopausal patients with node-negative breast cancer. <i>Ann Oncol</i> 2011;22: 2216-2226. | RCTs assessing antitumor effect of chemotherapy vs GnRH-a vs. chemotherapy followed by GnRH-a |
| Kendzierski DC, Schneider BP, Kiel PJ. Efficacy of Different Leuprolide Administration Schedules in Premenopausal Breast Cancer: A Retrospective Review. <i>Clin Breast Cancer</i> 2018. | Retrospective study evaluating antitumor effect of different schedules of GnRH-a (+ AI) |
| Kim HJ, Lee MH, Lee JE, Park S, Lee ES, Kang YJ, Shin HN, Kim SI, Lee JH, Im SA et al. Oncologic Safety of Gonadotropin-Releasing Hormone Agonist for Ovarian Function Protection During Breast Cancer Chemotherapy. <i>Clin Breast Cancer</i> 2018. | Retrospective study (better evidence available) |
| Kim I, Ryu JM, Paik HJ, Park S, Bae SY, Lee SK, Yu J, Kim SW, Nam SJ, Lee JE. Fertility Rates in Young Korean Breast Cancer Patients Treated with Gonadotropin-Releasing Hormone and Chemotherapy. <i>J Breast Cancer</i> 2017;20: 91-97. | Retrospective study (better evidence available) |
| Koga T, Umeda M, Endo Y, Ishida M, Fujita Y, Tsuji S, Takatani A, Shimizu T, Sumiyoshi R, Igawa T et al. Effect of a gonadotropin-releasing hormone analog for ovarian function preservation after intravenous cyclophosphamide therapy in systemic lupus erythematosus patients: a retrospective inception cohort study. <i>Int J Rheum Dis</i> 2018;21: 1287-1292. | Retrospective study (better evidence available) |
| Lambertini, M., et al., Ovarian Function and Fertility Preservation in Breast Cancer: Should Gonadotropin-Releasing Hormone Agonist be administered to All Premenopausal Patients Receiving Chemotherapy? <i>Clin Med Insights Reprod Health</i> , 2019. 13: p. 1179558119828393. | Narrative review discussing studies already included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Lee DY, Choi D. Is Menstruation or the Serum Hormone Level a Useful Predictor for Live Birth after Gonadotropin-Releasing Hormone Agonist during Chemotherapy in Young Breast Cancer Patients. <i>Gynecol Obstet Invest</i> 2017;82: 601-606. | Small study assessing hormone levels after GnRH-a treatment (better evidence available) |
| Meattini I, Saieva C, Meacci F, Scotti V, De Luca Cardillo C, Desideri I, Baldazzi V, Mangoni M, Scoccianti S, Detti B et al. Impact of age on cytotoxic-induced ovarian failure in breast cancer treated with adjuvant chemotherapy and triptorelin. <i>Future Oncol</i> 2016;12: 625-635. | Retrospective study (better evidence available) |

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| Meli M, Caruso-Nicoletti M, La Spina M, Nigro LL, Samperi P, D'Amico S, Bellia F, Miraglia V, Licciardello M, Cannata E et al. Triptorelin for Fertility Preservation in Adolescents Treated With Chemotherapy for Cancer. <i>J Pediatr Hematol Oncol</i> 2018;40: 269-276. | Retrospective study (better evidence available) |
| Munhoz RR, Pereira AA, Sasse AD, Hoff PM, Traina TA, Hudis CA, Marques RJ. Gonadotropin-Releasing Hormone Agonists for Ovarian Function Preservation in Premenopausal Women Undergoing Chemotherapy for Early-Stage Breast Cancer: A Systematic Review and Meta-analysis. <i>JAMA Oncol</i> 2016;2: 65-73. | All the RCTs were included in another meta-analysis (Lambertini 2018) |
| Park CY, Jung SY, Lee KB, Yang SH. The feasibility and efficacy of gonadotropin-releasing hormone agonists for prevention of chemotherapy induced ovarian failure in patient with gynecological malignancies. <i>Obstet Gynecol Sci</i> 2014;57: 478-483. | Small retrospective study (better evidence available) |
| Pashov AI, Tskhay VB, Ionouchene SV. The combined GnRH-agonist and intrauterine levonorgestrel-releasing system treatment of complicated atypical hyperplasia and endometrial cancer: a pilot study. <i>Gynecol Endocrinol</i> 2012;28: 559-561. | Small prospective study (better evidence available) |
| Pendse S, Ginsburg E, Singh AK. Strategies for preservation of ovarian and testicular function after immunosuppression. <i>Am J Kidney Dis</i> 2004;43: 772-781. | Narrative review |
| Phelan R, Mann E, Napurski C, DeFor TE, Petryk A, Miller WP, Wagner JE, Verneris MR, Smith AR. Ovarian function after hematopoietic cell transplantation: a descriptive study following the use of GnRH agonists for myeloablative conditioning and observation only for reduced-intensity conditioning. <i>Bone Marrow Transplant</i> 2016;51: 1369-1375. | Small prospective study (better evidence available) |
| Phelippeau, J., C.G. Cazalis, and M. Koskas. Ovarian protection and fertility preservation in women with cancer: A French national registry analysis between 2005 and 2014. <i>J Gynecol Obstet Hum Reprod</i> . 2019. 48(9): p. 705-710. | Relevant outcomes not assessed for this specific question |
| Poggio, F., et al., Potential Mechanisms of Ovarian Protection with Gonadotropin-Releasing Hormone Agonist in Breast Cancer Patients: A Review. <i>Clin Med Insights Reprod Health</i> , 2019. 13: p. 1179558119864584. | Narrative review discussing studies already included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Recchia F, Necozone S, Bratta M, Rosselli M, Guerriero G, Rea S. LH-RH analogues in the treatment of young women with early breast cancer: long-term follow-up of a phase II study. <i>Int J Oncol</i> 2015;46: 1354-1360. | Phase 2 single-arm study (better evidence available) |
| Shen YW, Zhang XM, Lv M, Chen L, Qin TJ, Wang F, Yang J, Liu PJ, Yang J. Utility of gonadotropin-releasing hormone agonists for prevention of chemotherapy-induced ovarian damage in premenopausal women with breast cancer: a systematic review and meta-analysis. <i>Onco Targets Ther</i> 2015;8: 3349-3359. | All the RCTs were included in a larger meta-analysis (Lambertini 2018) |
| Sofiyeva, N., et al., Gonadotropin-Releasing Hormone Analogs for Gonadal Protection During Gonadotoxic Chemotherapy: A Systematic Review and Meta-Analysis. <i>Reprod Sci</i> . 2019. 26(7): p. 939-953. | Smaller systematic review and meta-analysis |
| Somers EC, Marder W, Christman GM, Ognenovski V, McCune WJ. Use of a gonadotropin-releasing hormone analog for protection against premature ovarian failure during cyclophosphamide therapy in women with severe lupus. <i>Arthritis Rheum</i> 2005;52: 2761-2767. | Included in meta-analysis by Ben-Aharon 2010 |
| Song G, Gao H, Yuan Z. Effect of leuprolide acetate on ovarian function after cyclophosphamide-doxorubicin-based chemotherapy in premenopausal patients with breast cancer: results from a phase II randomized trial. <i>Med Oncol</i> 2013;30: 667. | RCT already included in the meta-analysis by Lambertini 2018 |
| Sugiu K, Iwamoto T, Kelly CM, Watanabe N, Motoki T, Ito M, Ohtani S, Higaki K, Imada T, Yuasa T et al. Neoadjuvant Chemotherapy with or without Concurrent Hormone Therapy in Estrogen Receptor-Positive Breast Cancer: NACED-Randomized Multicenter Phase II Trial. <i>Acta Med Okayama</i> 2015;69: 291-299. | Small RCT investigating the antitumor effect of concurrent chemo-endocrine therapy |
| Suh KJ, Kim SH, Lee KH, Kim TY, Kim YJ, Han SW, Kang E, Kim EK, Kim K, No JH et al. Bilateral Salpingo-oophorectomy Compared to Gonadotropin-Releasing Hormone Agonists in Premenopausal Hormone Receptor-Positive Metastatic Breast Cancer Patients Treated with Aromatase Inhibitors. <i>Cancer Res Treat</i> 2017;49: 1153-1163. | Retrospective study assessing antitumor effect of GnRHa + AI in metastatic breast cancer |
| Sun X, Dongol S, Jiang J, Kong B. Protection of ovarian function by GnRH agonists during chemotherapy: a meta-analysis. <i>Int J Oncol</i> 2014;44: 1335-1340. | All the RCTs were included in other meta-analyses (Lambertini 2018 & Senra 2018) |
| Turner NH, Partridge A, Sanna G, Di Leo A, Biganzoli L. Utility of gonadotropin-releasing hormone agonists for fertility preservation in young breast cancer patients: the benefit remains uncertain. <i>Ann Oncol</i> 2013;24: 2224-2235. | Narrative review discussing studies already included in another meta-analysis (Lambertini 2018) |
| von Wolff M, Kammerer U, Kollmann Z, Santi A, Dietl J, Frambach T. Combination of gonadotropin-releasing hormone (GnRH) agonists with GnRH antagonists before chemotherapy reduce but does not completely prevent a follicle-stimulating hormone flare-up. <i>Fertil Steril</i> 2011;95: 452-454. | Small study assessing use of GnRH antagonist in addition to GnRHa |
| von Wolff M, Stute P. Judging the Fertility Protective Effect of GnRH Agonists in Chemotherapy-It Is a Matter of Perspective. <i>Front Endocrinol (Lausanne)</i> 2017;8: 69. | Commentary discussing results of included RCTs and meta-analyses |
| Wang C, Chen M, Fu F, Huang M. Gonadotropin-Releasing Hormone Analog Cotreatment for the Preservation of Ovarian Function during Gonadotoxic Chemotherapy for Breast Cancer: A Meta-Analysis. <i>PLoS One</i> 2013;8: e66360. | All the RCTs were included in another meta-analysis (Lambertini 2018) |
| Wang C, Yu XF. The protective effects of gonadotropin-releasing hormone agonist on ovarian functions in breast Cancer patients receiving chemotherapy. <i>Discov Med</i> 2018;25: 7-12. | Narrative review discussing studies already included in a larger meta-analysis (Lambertini 2018) |
| Watanabe T, Yamada N, Yoshida Y, Yamamoto O. Granulomas induced by subcutaneous injection of a luteinizing hormone-releasing hormone analog: a case report and review of the literature. <i>J Cutan Pathol</i> 2010;37: 1116-1118. | Case report in prostate cancer on granulomas induced by subcutaneous GnRHa use |
| Yang B, Shi W, Yang J, Liu H, Zhao H, Li X, Jiao S. Concurrent treatment with gonadotropin-releasing hormone agonists for chemotherapy-induced ovarian damage in premenopausal women with breast cancer: a meta-analysis of randomized controlled trials. <i>Breast</i> 2013;22: 150-157. | All the RCTs were included in the meta-analysis (Lambertini 2018) |

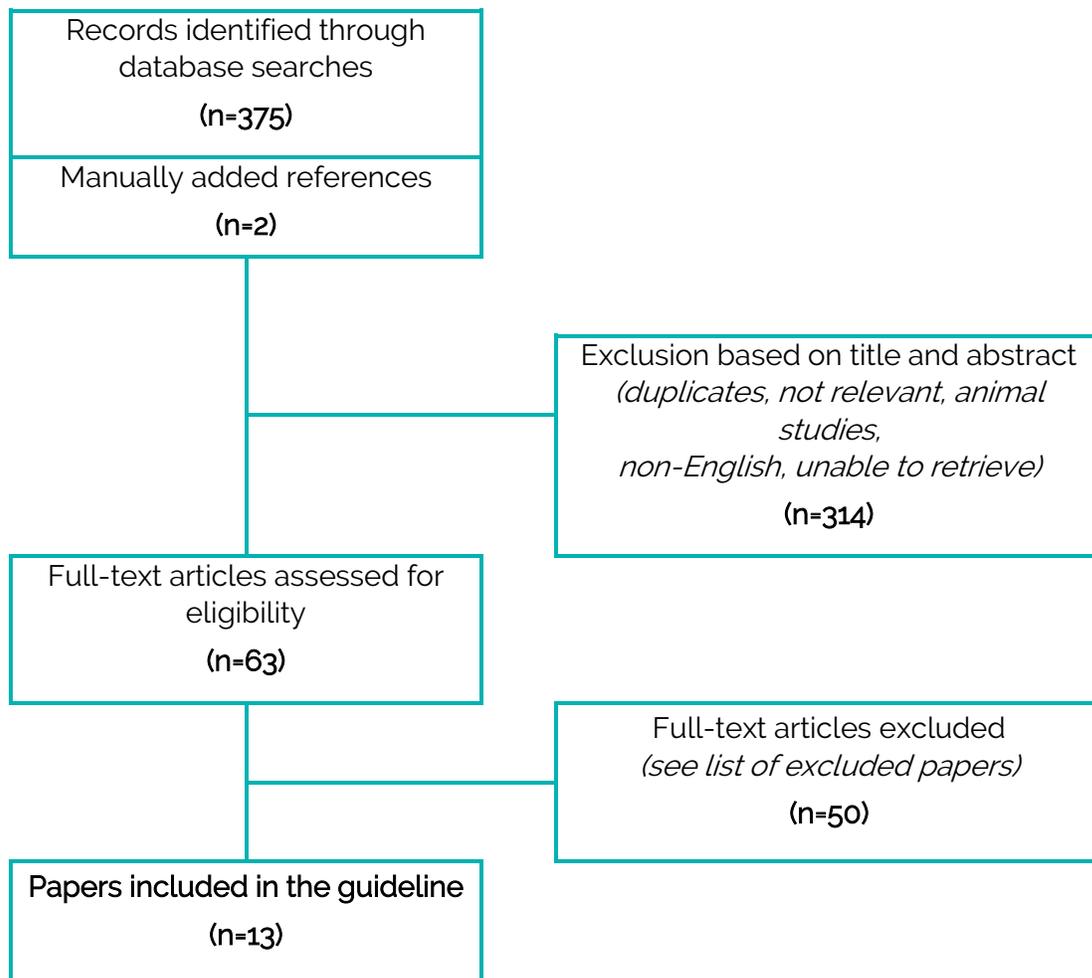
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| Zhang S, Zhang C, Liu J, Qin L, Cui S, Zhang J. A Phase II trial of Zoladex combined with CEF chemotherapy as neoadjuvant therapy in premenopausal women with hormone-responsive, operable breast cancer. <i>Med Oncol</i> 2012;29: 479-485. | Phase 2 single-arm study assessing antitumor effect of chemo-endocrine therapy |
| Zhang Y, Ji Y, Li J, Lei L, Wu S, Zuo W, Jia X, Wang Y, Mo M, Zhang N et al. Sequential versus simultaneous use of chemotherapy and gonadotropin-releasing hormone agonist (GnRH _a) among estrogen receptor (ER)-positive premenopausal breast cancer patients: effects on ovarian function, disease-free survival, and overall survival. <i>Breast Cancer Res Treat</i> 2018;168: 679-686. | RCT already included in the meta-analysis by Lambertini 2018 |
| Zhang Y, Xiao Z, Wang Y, Luo S, Li X, Li S. Gonadotropin-releasing hormone for preservation of ovarian function during chemotherapy in lymphoma patients of reproductive age: a summary based on 434 patients. <i>PLoS One</i> 2013;8: e80444. | All the RCTs were included in a more recent meta-analysis (Senra 2018); |
| Zheng, F., et al., Protective effect of gonadotropin-releasing hormone agonist against chemotherapy-induced ovarian dysfunction: A meta-analysis. <i>Oncol Lett</i> , 2019. 17(6): p. 5319-5326. | Smaller systematic review and meta-analysis |
| Zhong, Y., et al., GnRH _a for Ovarian Protection and the Association between AMH and Ovarian Function during Adjuvant Chemotherapy for Breast Cancer. <i>J Cancer</i> , 2019. 10(18): p. 4278-4285. | Small RCT (better evidence available) |
| Zhou H, Cao D, Yang J, Shen K, Lang J. Gonadotropin-Releasing Hormone Agonist Combined With a Levonorgestrel-Releasing Intrauterine System or Letrozole for Fertility-Preserving Treatment of Endometrial Carcinoma and Complex Atypical Hyperplasia in Young Women. <i>Int J Gynecol Cancer</i> 2017;27: 1178-1182. | Small retrospective study (better evidence available) |
| Zhu HL, Wang Y, Li XP, Wang CH, Wang Y, Cui H, Wang JL, Wei LH. Gonadotropin-releasing hormone agonists cotreatment during chemotherapy in borderline ovarian tumor and ovarian cancer patients. <i>Chin Med J (Engl)</i> 2013;126: 688-691. | Small retrospective study (better evidence available) |

Q18 Should Transposition of ovaries vs. no treatment be used for ovarian protection?

Search strings

| DATABASE | Search string |
|--------------------|---|
| PUBMED (merged) | ("transposition of ovaries" OR "ovarian transposition" OR "transposed ovaries") |
| COCHRANE | (transposition of ovaries OR ovarian transposition OR transposed ovaries) |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
|---|--|
| Willows K, Lennox G, Covens A. Fertility-sparing management in cervical cancer: balancing oncologic outcomes with reproductive success. <i>Gynecol Oncol Res Pract</i> 2016;3: 9. | Article on trachelectomy, no transposition |
| Dursun P, Ayhan A, Yanik FB, Kuscu E. Ovarian transposition for the preservation of ovarian function in young patients with cervical carcinoma. <i>Eur J Gynaecol Oncol</i> 2009;30: 13-15. | Full text not available |
| Koliopoulos G, Sotiriadis A, Kyrgiou M, Martin-Hirsch P, Makrydimas G, Paraskevaidis E. Conservative surgical methods for FIGO stage IA2 squamous cervical carcinoma and their role in preserving women's fertility. <i>Gynecol Oncol</i> 2004;93: 469-473. | Paper on trachelectomy |
| Bisharah M, Tulandi T. Laparoscopic preservation of ovarian function: an underused procedure. <i>Am J Obstet Gynecol</i> 2003;188: 367-370. | Case report |
| Howard FM. Laparoscopic lateral ovarian transposition before radiation treatment of Hodgkin disease. <i>J Am Assoc Gynecol Laparosc</i> 1997;4: 601-604. | Case report |
| Fernandez-Pineda I, Davidoff AM, Lu L, Rao BN, Wilson CL, Srivastava DK, Klosky JL, Metzger ML, Krasin MJ, Ness KK et al. Impact of ovarian transposition before pelvic irradiation on ovarian function among long-term survivors of childhood Hodgkin lymphoma: A report from the St. Jude Lifetime Cohort Study. <i>Pediatr Blood Cancer</i> 2018;65: e27232. | Study of 49 women underwent OT but all women received chemo with alkylating agents |
| Shou H, Chen Y, Chen Z, Zhu T, Ni J. Laparoscopic ovarian transposition in young women with cervical squamous cell carcinoma treated by primary pelvic irradiation. <i>Eur J Gynaecol Oncol</i> 2015;36: 25-29. | Full text not available |
| Zhao C, Wang JL, Wang SJ, Zhao LJ, Wei LH. Analysis of the risk factors for the recurrence of cervical cancer following ovarian transposition. <i>Eur J Gynaecol Oncol</i> 2013;34: 124-127. | Full text not available |
| Mazonakis M, Damilakis J, Varveris H, Gourtsoyannis N. Radiation dose to laterally transposed ovaries during external beam radiotherapy for cervical cancer. <i>Acta Oncol</i> 2006;45: 702-707. | Experimental study |
| Haie-Meder C, Mlika-Cabanne N, Michel G, Briot E, Gerbaulet A, Lhomme C, Cosset JM, Sarrazin D, Flamant F, Hayat M. Radiotherapy after ovarian transposition: ovarian function and fertility preservation. <i>Int J Radiat Oncol Biol Phys</i> 1993;25: 419-424. | Full text not available |
| Baiocchi G, Mantoan H, Chen MJ, Faloppa CC. Uterine transposition after radical trachelectomy. <i>Gynecol Oncol</i> 2018;150: 387-388. | Case report |
| Delotte J, Bongain A. Ovarian Torsion After Transposition in Patients With Gynecologic Cancer. <i>J Minim Invasive Gynecol</i> 2016;23: 139. | Comment |
| Sicam RV, Huang KG, Chang YC, Lee CL. Maintenance of ovarian function in end-of-life cervical cancer patient following primary surgico-radiotherapy and ovarian transposition. <i>J Gynecol Oncol</i> 2013;24: 204-207. | Case report |
| Sicam RV, Huang KG, Lee CL, Chen CY, Ueng SH. Treatment of fallopian tube metastasis in cervical cancer after laparoscopic ovarian transposition. <i>J Minim Invasive Gynecol</i> 2012;19: 262-265. | Case report |
| Eitan R, Krissi H, Beller U, Levavi H, Goldschmit C, Ben-Haroush A, Peled Y. Laparoscopic adnexal transposition: novel surgical technique. <i>Int J Gynecol Cancer</i> 2011;21: 1704-1707. | Technical description |
| Bloemers MC, Portelance L, Legler C, Renaud MC, Tan SL. Preservation of ovarian function by ovarian transposition prior to concurrent chemotherapy and pelvic radiation for cervical cancer. A case report and review of the literature. <i>Eur J Gynaecol Oncol</i> 2010;31: 194-197. | Case report |
| Salakos N, Bakalianou K, Iavazzo C, Paltoglou G, Papadimas K, Liapis A, Kondi-Pafiti A. The role of ovarian transposition in patients with early stage cervical cancer--two case reports. <i>Eur J Gynaecol Oncol</i> 2008;29: 280-281. | Case report |
| Farber LA, Ames JW, Rush S, Gal D. Laparoscopic ovarian transposition to preserve ovarian function before pelvic radiation and chemotherapy in a young patient with rectal cancer. <i>MedGenMed</i> 2005;7: 66. | Case report |
| Guo Y, Shen W, Jiang Y, Liu W, Li X. Application of ovarian transposition during hysterectomy. <i>Chin Med J (Engl)</i> 2003;116: 688-691. | Full text not available |
| Ishii K, Aoki Y, Takakuwa K, Tanaka K. Ovarian function after radical hysterectomy with ovarian preservation for cervical cancer. <i>J Reprod Med</i> 2001;46: 347-352. | Full text not available |
| Yarali H, Demiroglu A, Bukulmez O, Coskun F, Gurgan T. Laparoscopic high lateral transposition of both ovaries before pelvic irradiation. <i>J Am Assoc Gynecol Laparosc</i> 2000;7: 237-239. | Case report |
| Schulz-Lobmeyr I, Schratte-Sehn A, Huber J, Wenzl R. Laparoscopic lateral ovarian transposition before pelvic irradiation for a Non Hodgkin lymphoma. <i>Acta Obstet Gynecol Scand</i> 1999;78: 350-352. | Case report |
| Classe JM, Mahe M, Moreau P, Rapp MJ, Maisonneuve H, Lemevel A, Bourdin S, Harousseau JL, Cuilliere JC. Ovarian transposition by laparoscopy before radiotherapy in the treatment of Hodgkin's disease. <i>Cancer</i> 1998;83: 1420-1424. | Case report |
| Kwik M, O'Neill A, Hamani Y, Chapman M, Chou D. Laparoscopic ovarian transposition with potential preservation of natural fertility. <i>J Minim Invasive Gynecol</i> 2010;17: 411-412. | Case report |
| Dabirashrafi H, Moghadami-Tabrizi N, Zandinejad K. Laparoscopic ovarian transposition with subsequent intrauterine pregnancy. <i>J Am Assoc Gynecol Laparosc</i> 1996;3: 515-517. | Case report |
| Donaldson SS. Preservation of ovarian function after lateral ovarian transposition. <i>Int J Radiat Oncol Biol Phys</i> 1993;25: 565. | Case report |
| Winarto H, Febia E, Purwoto G, Nuranna L. The need for laparoscopic ovarian transposition in young patients with cervical cancer undergoing radiotherapy. <i>Int J Reprod Med</i> 2013;2013: 173568. | Narrative review |

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| Picone O, Aucouturier JS, Louboutin A, Coscas Y, Camus E. Abdominal wall metastasis of a cervical adenocarcinoma at the laparoscopic trocar insertion site after ovarian transposition: case report and review of the literature. <i>Gynecol Oncol</i> 2003;90: 446-449. | Narrative review |
| Mossa B, Schimberni M, Di Benedetto L, Mossa S. Ovarian transposition in young women and fertility sparing. <i>Eur Rev Med Pharmacol Sci</i> 2015;19: 3418-3425. | More recent review available |
| Salih SM, Albayrak S, Seo S, Stewart SL, Bradley K, Kushner DM. Diminished Utilization of in Vitro Fertilization Following Ovarian Transposition in Cervical Cancer Patients. <i>J Reprod Med</i> 2015;60: 345-353. | Small observational study |
| Yoon A, Lee YY, Park W, Huh SJ, Choi CH, Kim TJ, Lee JW, Kim BG, Bae DS. Correlation between location of transposed ovary and function in cervical cancer patients who underwent radical hysterectomy. <i>Int J Gynecol Cancer</i> 2015;25: 688-693. | Small retrospective study |
| Barahmeh S, Al Masri M, Badran O, Masarweh M, El-Ghanem M, Jaradat I, Lataifeh I. Ovarian transposition before pelvic irradiation: indications and functional outcome. <i>J Obstet Gynaecol Res</i> 2013;39: 1533-1537. | Small observational study |
| Gareer W, Gad Z, Gareer H. Needle oophoropexy: a new simple technique for ovarian transposition prior to pelvic irradiation. <i>Surg Endosc</i> 2011;25: 2241-2246. | Included in review Hoekman 2019 |
| Kung FT, Chen HC, Huang CC, Ho JT, Cheng BH. Preservation of ovarian germinal follicles by temporary laparoscopic ovarian transposition in teenaged girls undergoing craniospinal irradiation for radiosensitive central nervous system tumors. <i>Taiwan J Obstet Gynecol</i> 2008;47: 300-304. | Small observational study |
| Williams RS, Littell RD, Mendenhall NP. Laparoscopic oophoropexy and ovarian function in the treatment of Hodgkin disease. <i>Cancer</i> 1999;86: 2138-2142. | Small observational study |
| Thibaud E, Ramirez M, Brauner R, Flamant F, Zucker JM, Fekete C, Rappaport R. Preservation of ovarian function by ovarian transposition performed before pelvic irradiation during childhood. <i>J Pediatr</i> 1992;121: 880-884. | Small observational study |
| Swift BE, Leung E, Vicus D, Covens A. Laparoscopic ovarian transposition prior to pelvic radiation for gynecologic cancer. <i>Gynecol Oncol Rep</i> 2018;24: 78-82. | Small observational study |
| Selter J, Grossman Becht LC, Huang Y, Ananth CV, Neugut AI, Hershman DL, Wright JD. Utilization of ovarian transposition for fertility preservation among young women with pelvic malignancies who undergo radiotherapy. <i>Am J Obstet Gynecol</i> 2018. | Utilisation of OT |
| Sioulas VD, Jorge S, Chern JY, Schiavone MB, Weiser MR, Kelvin JF, Gardner GJ, Sonoda Y, Abu-Rustum NR, Goodman KA et al. Robotically Assisted Laparoscopic Ovarian Transposition in Women with Lower Gastrointestinal Cancer Undergoing Pelvic Radiotherapy. <i>Ann Surg Oncol</i> 2017;24: 251-256. | Small retrospective study |
| Del Pup L, Salvagno F, Borini A, Trovo M, Peccatori FA. Ovarian transposition in young women and fertility sparing. <i>Eur Rev Med Pharmacol Sci</i> 2016;20: 197-198. | Letter |
| Turan AT, Keskin HL, Dundar B, Gundogdu B, Ozgul N, Boran N, Tulunay G, Kose MF. Ovarian transposition for stage Ib squamous cell cervical cancer - lack of effects on survival rates? <i>Asian Pac J Cancer Prev</i> 2013;14: 133-137. | Oncological outcomes |
| Al-Asari S, Abduljabbar A. Laparoscopic ovarian transposition before pelvic radiation in rectal cancer patient: safety and feasibility. <i>Ann Surg Innov Res</i> 2012;6: 9. | 3 cases |
| Elizur SE, Tulandi T, Meterissian S, Huang JY, Levin D, Tan SL. Fertility preservation for young women with rectal cancer--a combined approach from one referral center. <i>J Gastrointest Surg</i> 2009;13: 1111-1115. | Small observational study |
| Hirakawa M, Yoshimitsu K, Kakiyama D, Irie H, Asayama Y, Ishigami K, Honda H. Detection of the gonadal veins in the diagnosis of transposed ovaries in patients with cervical carcinoma: a useful sign on MDCT. <i>AJR Am J Roentgenol</i> 2007;188: 1564-1567. | Not relevant for the question |
| Husseinzadeh N, van Aken ML, Aron B. Ovarian transposition in young patients with invasive cervical cancer receiving radiation therapy. <i>Int J Gynecol Cancer</i> 1994;4: 61-65. | Included in review Hoekman 2019 |
| Van Eijkeren MA, Van Der Wijk I, El Sharouni SY, Heintz AP. Benefits and side effects of lateral ovarian transposition (LOT) performed during radical hysterectomy and pelvic lymphadenectomy for early stage cervical cancer. <i>Int J Gynecol Cancer</i> 1999;9: 396-400. | Included in review Hoekman 2019 |
| Shylasree, T.S. and P. Patil, Laparoscopic Ovarian Transposition in Rectal Cancer: More than Just Oncological Outcomes. <i>Indian J Surg Oncol</i> , 2019. 10(2): p. 309-312. | Narrative review |
| Phelippeau, J., C.G. Cazalis, and M. Koskas, Ovarian protection and fertility preservation in women with cancer: A French national registry analysis between 2005 and 2014. <i>J Gynecol Obstet Hum Reprod</i> , 2019. 48(9): p. 705-710. | Mixed treatments |
| Khiat, S., et al., Fertility preservation strategies for rectal cancer in reproductive-age women. <i>Future Oncol</i> , 2019. 15(22): p. 2635-2643. | Narrative review |
| Mariani, S., et al., Fertility preservation in chemo-radiotherapy for rectal cancer: A combined approach. <i>Clin Transl Radiat Oncol</i> , 2019. 19: p. 77-79. | Case report |

Q20 What are ongoing developments with regards to FP?

This question was answered as a narrative question. A literature search performed, and additional papers were retrieved through expert opinion and snowballing.

Relevant papers were selected and summarized in a narrative text.

Search strings

| DATABASE | Search string |
|----------|--|
| PUBMED | ("in vitro oocyte culture" OR "fertility restoration" OR "female germline stem cells" OR "follicle growth in 3D co-culture" OR "human oocyte culture system" OR "artificial ovary" OR "ovarian stem cells" OR "Primordial follicle culture" OR "pre-antral follicle culture") OR (("stem cell" OR "resting follicle" OR follicle OR "bone marrow" OR "generat" germ cells" OR "generat" oocyte") AND ("Fertility Preservation"[Mesh] OR "Fertility Preservation")) |

List of excluded papers

| Reference | Exclusion criterium |
|-----------|---------------------|
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Q21 How should patients be re-assessed before use of stored material? General + specific issues

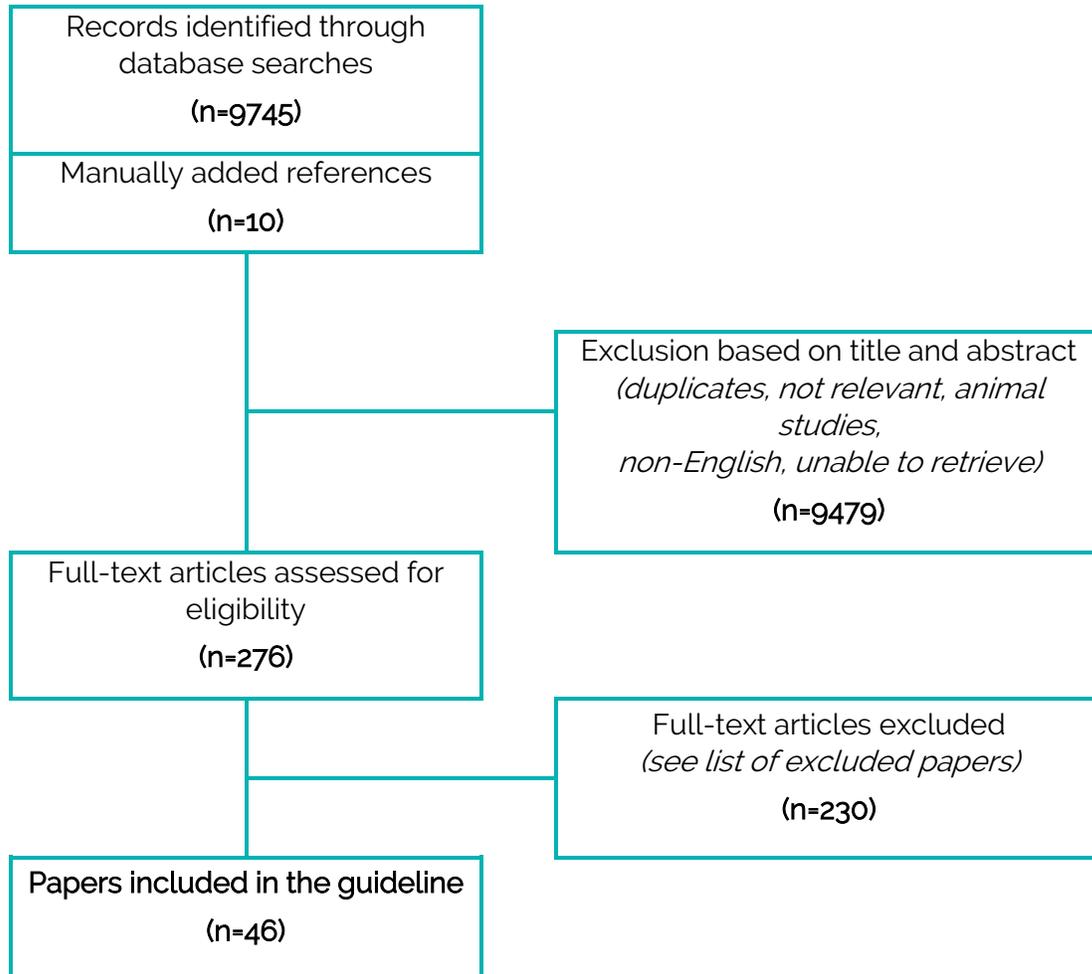
This question was answered from the results of the literature search for Question 22. Relevant references were selected and combined with expert opinion from the GDG members, and information from additional papers suggested by the GDG members.

Q22 What is the effect of previous gonadotoxic treatments/underlying condition on obstetric outcomes?

Search strings

| DATABASE | Search string |
|---------------------|---|
| PUBMED MERGE 1 | ("Uterine irradiation" OR "Uterine radiation" OR "pelvic radiation" OR "pelvic irradiation" OR "Uterine radiotherapy" OR "pelvic radiotherapy" OR brachytherapy OR Trachelectomy OR "deep Loop biopsy" OR "cervical cancer" OR "cancer of the cervix") AND ("Pregnancy Outcome"[Mesh] OR "Pregnancy Complications"[Mesh] OR "spontaneous pregnancy" OR "Pregnancy, High-Risk"[Mesh]) |
| PUBMED MERGE 2 | ((("Cancer Survivors"[Mesh] OR "Cancer Survivors") OR (("Neoplasms"[Mesh] OR Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) AND ("Antineoplastic Agents"[Mesh] OR chemotherapy OR anthracycline))) AND ("Pregnancy Outcome"[Mesh] OR "Pregnancy Complications"[Mesh] OR "spontaneous pregnancy" OR "Cardiotoxicity"[Mesh] OR "Pregnancy, High-Risk"[Mesh]) |
| PUBMED 5 | ("Systemic lupus erythematosus" OR "Lupus Erythematosus, Systemic"[Mesh] OR "Behcet's disease" OR "Behcet Syndrome"[Mesh] OR "Churg-Strauss syndrome" OR "Churg-Strauss Syndrome"[Mesh] OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Glomerulonephritis"[Mesh] OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Granulomatosis with Polyangiitis"[Mesh] OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Inflammatory Bowel Diseases"[Mesh] OR "Arthritis, Rheumatoid"[Mesh] OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus"[Mesh] OR "Autoimmune Diseases"[Mesh] OR "Haematological diseases" OR "Hematologic Diseases"[Mesh] OR "Anemia"[Mesh] OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis"[Mesh] OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome"[Mesh] OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome"[Mesh] OR Galactosaemia OR "Galactosemias"[Mesh] OR "Beta-thalassaemia" OR "beta-Thalassemia"[Mesh] OR "Endometriosis"[Mesh] OR "Endometriosis") AND ("Pregnancy Outcome"[Mesh] OR "Pregnancy Complications"[Mesh] OR "spontaneous pregnancy" OR "Pregnancy, High-Risk"[Mesh]) |
| PUBMED 6 | ("Transgender Persons"[Mesh] OR Transgender OR Transsexual) AND ("Pregnancy Outcome"[Mesh] OR "Pregnancy Complications"[Mesh] OR "spontaneous pregnancy" OR "Pregnancy, High-Risk"[Mesh] OR "pregnancy") |
| COCHRANE MERGE 1 | ("Uterine irradiation" OR "Uterine radiation" OR "pelvic radiation" OR "pelvic irradiation" OR "Uterine radiotherapy" OR "pelvic radiotherapy" OR brachytherapy OR Trachelectomy OR "deep Loop biopsy" OR "cervical cancer" OR "cancer of the cervix" OR "Systemic lupus erythematosus" OR "Behcet's disease" OR "Behcet Syndrome" OR "Churg-Strauss syndrome" OR "eosinophilic granulomatosis" OR "Steroid resistant glomerulonephritis" OR "glomerulonephritis" OR "Granulomatosis with polyangiitis" OR "Wegener's granulomatosis" OR "Inflammatory bowel diseases" OR "Crohn Disease" OR "ulcerative colitis" OR "Rheumatoid arthritis" OR "Pemphigus vulgaris" OR "Pemphigus" OR "Autoimmune Diseases" OR "Haematological diseases" OR "Anemia" OR "sickle cell anaemia" OR "thalassaemia major" OR "plastic anaemia" OR "Altered hypothalamic-pituitary-gonadal axis" OR "Ovarian oophoritis" OR "Oophoritis" OR "Benign ovarian tumours" OR "Mosaic Turner's syndrome" OR "Turner Syndrome" OR "Fragile X Mental Retardation 1" OR "Fragile X Syndrome" OR Galactosaemia OR "Galactosemias" OR "Beta-thalassaemia" OR "Endometriosis") AND ("Pregnancy Outcome" OR "Pregnancy Complications" OR "spontaneous pregnancy" OR "Pregnancy") |
| COCHRANE MERGE 2 | ("Cancer Survivors" OR ((Cancer OR tumor OR neoplasm OR malignancy OR neoplasms) AND ("Antineoplastic Agents" OR chemotherapy OR anthracycline))) AND ("Pregnancy Outcome" OR "Pregnancy Complications" OR "spontaneous pregnancy" OR "Cardiotoxicity" OR "Pregnancy") |
| COCHRANE 6 | ("Transgender Persons" OR Transgender OR Transsexual) AND ("Pregnancy Outcome"[Mesh] OR "Pregnancy Complications" OR "spontaneous pregnancy" OR "pregnancy") |

Flowchart



List of excluded papers

| Reference | Exclusion criterium |
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| Abruzzese, E., et al., Back to the future: Treatment-free remission and pregnancy in chronic myeloid leukemia. <i>Eur J Haematol</i> , 2019. 102(2): p. 197-199. | letter to the editor, exclude |
| Agorastos T, Zafrakas M, Mastrominas M. Long-term follow-up after cervical cancer treatment and subsequent successful surrogate pregnancy. <i>Reprod Biomed Online</i> 2009;19: 250-251. | case report |
| Aisner J, Wiernik PH, Pearl P. Pregnancy outcome in patients treated for Hodgkin's disease. <i>J Clin Oncol</i> 1993;11: 507-512. | Interview study - rather old |
| Aleman JM, Arlien F, Tjalma WAA. The impact of conisation on pregnancy outcome. <i>Eur J Gynaecol Oncol</i> 2016;37: 786-791. | full paper not available |
| Alexopoulos E, Efkarpidis S, Fay TN, Williamson KM. Pregnancy following radical trachelectomy and pelvic lymphadenectomy for Stage I cervical adenocarcinoma. <i>Acta Obstet Gynecol Scand</i> 2002;81: 791-792. | case report |
| Al-Ibrahim A, Parrish J, Dunn E, Swallow C, Maxwell C. Pregnancy and maternal outcomes in women with prior or current gastrointestinal malignancies. <i>J Obstet Gynaecol Can</i> 2014;36: 34-41. | small retrospective cohort study |
| Alici Davutoglu E, Madazli R, Yilmaz N, Ozel A, Uludag S, Sozen I. Pregnancy in cancer patients and survivors; experience of a university hospital in Turkey. <i>J Obstet Gynaecol</i> 2017;37: 1015-1019. | interesting but small numbers |
| Almuwaqqat, Z., et al., Breast Cancer and Heart Failure. <i>Heart Fail Clin</i> , 2019. 15(1): p. 65-75. | not pregnancy - exclude |
| Alvarez, R.M., et al., MRI measurement of residual cervical length after radical trachelectomy for cervical cancer and the risk of adverse pregnancy outcomes: a blinded imaging analysis. <i>Bjog</i> , 2018. 125(13): p. 1726-1733. | cervical cancer |
| Anderson, C., et al., Live birth outcomes after adolescent and young adult breast cancer. <i>Int J Cancer</i> , 2018. 142(10): p. 1994-2002. | not relevant addition |
| Arbyn M, Kyrgiou M, Simoons-Sch A, Raifu AO, Koliopoulos G, Martin-Hirsch P, Prendiville W, Paraskevaides E. Perinatal mortality and other severe adverse pregnancy outcomes associated with treatment of cervical intraepithelial neoplasia: meta-analysis. <i>Bmj</i> 2008;337: a1284. | considered irrelevant |
| Ayhan A, Celik H, Taskiran C, Bozdag G, Aksu T. Oncologic and reproductive outcome after fertility-saving surgery in ovarian cancer. <i>Eur J Gynaecol Oncol</i> 2003;24: 223-232. | full paper not available |
| Azim HA, Jr., Kroman N, Paesmans M, Gelber S, Rotmensch N, Armeje L, De Mattos-Arruda L, Pistilli B, Pinto A, Jensen MB et al. Prognostic impact of pregnancy after breast cancer according to estrogen receptor status: a multicenter retrospective study. <i>J Clin Oncol</i> 2013;31: 73-79. | included in the dabrosin systematic review |
| Azim HA, Jr., Peccatori FA, de Azambuja E, Piccart MJ. Motherhood after breast cancer: searching for la dolce vita. <i>Expert Rev Anticancer Ther</i> 2011;11: 287-298. | it is the same as the SR published in 2011 |
| Azim HA, Jr., Santoro L, Pavlidis N, Gelber S, Kroman N, Azim H, Peccatori FA. Safety of pregnancy following breast cancer diagnosis: a meta-analysis of 14 studies. <i>Eur J Cancer</i> 2011;47: 74-83. | included in Dabrosin review however systematic |
| Babak, S. and C. Brezden-Masley, Cardiovascular sequelae of breast cancer treatments: A review. <i>Curr Probl Cancer</i> , 2018. 42(4): p. 409-421. | cardiotoxicity in bc, not pregnancy |
| Balashov DN, Papusha LI, Nazarenko TA, Trakhtman PE, Revishvili NA, Maschan AA, Persiantseva MI, Andriutsa AV, Skorobogatova EV, Skvortsova YV et al. Recovery of ovarian function and pregnancy in a patient with AML after myeloablative busulphan-based conditioning regimen. <i>J Pediatr Hematol Oncol</i> 2011;33: e154-155. | case report |
| Balsat, M., et al., Successful pregnancies in patients with BCR-ABL-positive leukemias treated with interferon-alpha therapy during the tyrosine kinase inhibitors era. <i>Eur J Haematol</i> , 2018. 101(6): p. 774-780. | not relevant |
| Barton SE, Missmer SA, Berry KF, Ginsburg ES. Female cancer survivors are low responders and have reduced success compared with other patients undergoing assisted reproductive technologies. <i>Fertil Steril</i> 2012;97: 381-386. | full paper not available |
| Baughan CA, Ryall RD, Pope RA. Successful pregnancy following tailor-made intracavitary radiotherapy for microinvasive adenocarcinoma of the endocervix. <i>Clin Oncol (R Coll Radiol)</i> 1992;4: 192-193. | case report |
| Berman, E., Pregnancy in Patients With Chronic Myeloid Leukemia. <i>J Natl Compr Canc Netw</i> , 2018. 16(5s): p. 660-662. | leukemia- not relevant addition |
| Bernard S, Ouellet MP, Moffet H, Roy JS, Dumoulin C. Effects of radiation therapy on the structure and function of the pelvic floor muscles of patients with cancer in the pelvic area: a systematic review. <i>J Cancer Surviv</i> 2016;10: 351-362. | there is no mention to pregnancy complications or effect on pregnancy or method of delivery |
| Bernardini M, Barrett J, Seaward G, Covens A. Pregnancy outcomes in patients after radical trachelectomy. <i>Am J Obstet Gynecol</i> 2003;189: 1378-1382. | too small and old |
| Bines J, Gradishar WJ. Primary care issues for the breast cancer survivor. <i>Compr Ther</i> 1997;23: 605-611. | full paper not available |
| Blakely LJ, Buzdar AU, Lozada JA, Shullaih SA, Hoy E, Smith TL, Hortobagyi GN. Effects of pregnancy after treatment for breast carcinoma on survival and risk of recurrence. <i>Cancer</i> 2004;100: 465-469. | included in Azim systematic review |
| Blumenfeld Z, Benaroush M, Zuckerman T. Spontaneous pregnancy and normal delivery after repeated autologous bone marrow transplantation and GnRH agonist treatment. <i>Hum Reprod</i> 2007;22: 2346. | case report |
| Blumenfeld Z, Zuckerman T. Repeated spontaneous pregnancies and successful deliveries after repeated autologous stem cell transplantation and GnRH-agonist treatment. <i>Oncologist</i> 2010;15: 59-60. | case report |
| Blumenfeld Z. Chemotherapy and fertility. <i>Best Pract Res Clin Obstet Gynaecol</i> 2012;26: 379-390. | non-systematic review |
| Bokhman JV, Bakidoze EV, Ourmancheeva AF. Fertility, pregnancy and cancer. <i>Acta Obstet Gynecol Scand Suppl</i> 1997;164: 14-18. | full paper not available |
| Bowman ZS, Simons M, Sok C, Draper ML. Cervical insufficiency and placenta accreta after prior pelvic radiation. <i>J Obstet Gynaecol</i> 2014;34: 735. | case report |

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| Braems G, Denys H, De Wever O, Cocquyt V, Van den Broecke R. Use of tamoxifen before and during pregnancy. <i>Oncologist</i> 2011;16: 1547-1551. | Included in review Schuurman 2019 |
| Brice P, Pautier P, Marolleau JP, Castaigne S, Gisselbrecht C. Pregnancy after autologous bone marrow transplantation for malignant lymphomas. <i>Nouv Rev Fr Hematol</i> 1994;36: 387-388. | already covered in the reviews |
| Brioli A, Muggè LO, Hochhaus A, Von Lilienfeld-Toal M. Safety issues and management of toxicities associated with new treatments for multiple myeloma. <i>Expert review of hematology</i> 2017;10: 193-205. | review - no discussion of pregnancy or obstetric outcomes |
| Bruinsma F, Lumley J, Tan J, Quinn M. Precancerous changes in the cervix and risk of subsequent preterm birth. <i>Bjog</i> 2007;114: 70-80. | precancerous changes in the cervix, not relevant |
| Byrne J. Fertility and pregnancy after malignancy. <i>Semin Perinatol</i> 1990;14: 423-429. | full paper not available |
| Calhoun K, Hansen N. The effect of pregnancy on survival in women with a history of breast cancer. <i>Breast Dis</i> 2005;23: 81-86. | non-systematic review |
| Capilna ME, Rusu SC, Puiac CI, Danilidis A, Szabo B. Spontaneous intrauterine pregnancy following abdominal radical trachelectomy--a case report. <i>Eur J Gynaecol Oncol</i> 2015;36: 229-230. | case report |
| Carter J, Lewin S, Abu-Rustum N, Sonoda Y. Reproductive issues in the gynecologic cancer patient. <i>Oncology (Williston Park)</i> 2007;21: 598-606; discussion 606-599. | narrative review |
| Cason J, Rice P, Best JM. Transmission of cervical cancer-associated human papilloma viruses from mother to child. <i>Intervirology</i> 1998;41: 213-218. | full paper not available |
| Castanon A, Landy R, Brocklehurst P, Evans H, Peebles D, Singh N, Walker P, Patnick J, Sasieni P. Is the increased risk of preterm birth following excision for cervical intraepithelial neoplasia restricted to the first birth post treatment? <i>Bjog</i> 2015;122: 1191-1199. | considered irrelevant |
| Chae, S.H., et al. Pregnancy and oncologic outcomes after fertility-sparing management for early stage endometrioid endometrial cancer. <i>Int J Gynecol Cancer</i> , 2019, 29(1): p. 77-85. | full paper not available |
| Chasle S, How CC. The effect of cytotoxic chemotherapy on female fertility. <i>Eur J Oncol Nurs</i> 2003;7: 91-98. | review for nurses |
| Christinat A, Pagani O. Fertility after breast cancer. <i>Maturitas</i> 2012;73: 191-196. | non-systematic review |
| Cibula, D., et al. The European Society of Gynaecological Oncology/European Society for Radiotherapy and Oncology/European Society of Pathology Guidelines for the Management of Patients With Cervical Cancer. <i>Int J Gynecol Cancer</i> , 2018, 28(4): p. 641-655. | cancer treatment, not pregnancy |
| Cipres D, Seidman D, Cloniger C, 3rd, Nova C, O'Shea A, Obedin-Maliver J. Contraceptive use and pregnancy intentions among transgender men presenting to a clinic for sex workers and their families in San Francisco. <i>Contraception</i> 2017;95: 186-189. | contraception |
| Clark H, Kurinczuk JJ, Lee AJ, Bhattacharya S. Obstetric outcomes in cancer survivors. <i>Obstet Gynecol</i> 2007;110: 849-854. | interesting data on preterm labour, PPH and operative deliveries |
| Cordoba O, Bellet M, Vidal X, Cortes J, Llorba E, Rubio IT, Xercavins J. Pregnancy after treatment of breast cancer in young women does not adversely affect the prognosis. <i>Breast</i> 2012;21: 272-275. | higher quality evidence available |
| Cortes JE, Abruzzese E, Chelysheva E, Guha M, Wallis N, Appertley JF. The impact of dasatinib on pregnancy outcomes. <i>Am J Hematol</i> 2015;90: 1111-1115. | pregnancy occurred during chemotherapy |
| Costarelli V, Yiannakouris N. Breast cancer risk in women: the protective role of pregnancy. <i>Nurs Stand</i> 2010;24: 35-40. | full paper not available |
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| Dabrosin C. An overview of pregnancy and fertility issues in breast cancer patients. <i>Ann Med</i> 2015;47: 673-678. | INCLUDED FOR THE NARRATIVE SECTION ON PATIENT ASSESMENT |
| Danet, C., et al. Pregnancy outcomes in women exposed to cancer chemotherapy. <i>Pharmacoepidemiol Drug Saf</i> , 2018, 27(12): p. 1302-1308. | not relevant addition |
| de Bree E, Makrigiannakis A, Askoxylakis J, Melissas J, Tsiftsis DD. Pregnancy after breast cancer. A comprehensive review. <i>J Surg Oncol</i> 2010;101: 534-542. | non-systematic review |
| De Carolis S, Garofalo S, Degennaro VA, Zannoni GF, Salvi S, Moresi S, Di Pasquo E, Scambia G. Placental and infant metastasis of maternal melanoma: a new case. <i>J Obstet Gynaecol</i> 2015;35: 417-418. | case report |
| de la Haba-Rodríguez J, Calderay M. Impact of breast cancer treatment on fertility. <i>Breast Cancer Res Treat</i> 2010;123 Suppl 1: 59-63. | review of old papers, protocols might not be still in use |
| de Menezes E, Tuck SM. Pelvic radiotherapy damage to the endometrium causing morbid adherence of placenta. A new risk factor? <i>J Obstet Gynaecol</i> 2007;27: 526-527. | already covered in the reviews |
| De Sanctis V, Filippone FR, Alfo M, Muni R, Cavalieri E, Pulsoni A, Annechini G, Valeriani M, Osti MF, Minniti G et al. Impact of different treatment approaches on pregnancy outcomes in 99 women treated for Hodgkin lymphoma. <i>Int J Radiat Oncol Biol Phys</i> 2012;84: 755-761. | reassuring paper but low numbers (99 cases) |
| Delaney AA, Gubbels AL, Remmenga S, Tomich P, Molpus K. Successful pregnancy after fertility-sparing local resection and uterine reconstruction for low-grade endometrial stromal sarcoma. <i>Obstet Gynecol</i> 2012;120: 486-489. | case report |
| Derks-Smeets IA, de Die-Smulders CE, Mackens S, van Golde R, Paulussen AD, Dreesen J, Tournaye H, Verdyck P, Tjan-Heijnen VC, Meijer-Hoogeveen M et al. Hereditary breast and ovarian cancer and reproduction: an observational study on the suitability of preimplantation genetic diagnosis for both asymptomatic carriers and breast cancer survivors. <i>Breast Cancer Res Treat</i> 2014;145: 673-681. | Not Relevant - Usefulness of PGD |
| Ding L, Li M, Yan L, Tang R, Chen ZJ. Effect of cervical conization on pregnancy outcome of in-vitro fertilization/intracytoplasmic sperm injection treatment: a retrospective cohort study. <i>Clin Exp Obstet Gynecol</i> 2016;43: 546-549. | full paper not available |
| Dodds L, Marrett LD, Tomkins DJ, Green B, Sherman G. Case-control study of congenital anomalies in children of cancer patients. <i>Bmj</i> 1993;307: 164-168. | small and old study |
| Dow KH, Kuhn D. Fertility options in young breast cancer survivors: a review of the literature. <i>Oncol Nurs Forum</i> 2004;31: E46-53. | full paper not available |

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| Duffy C, Allen S. Medical and psychosocial aspects of fertility after cancer. <i>Cancer J</i> 2009;15: 27-33. | INCLUDED FOR THE NARRATIVE SECTION ON PATIENT ASSESMENT |
| Durrieu G, Rigal M, Bugat R, Lapeyre-Mestre M. Fertility and outcomes of pregnancy after chemotherapy in a sample of childbearing aged women. <i>Fundam Clin Pharmacol</i> 2004;18: 573-579. | small study |
| Ebisawa K, Takano M, Fukuda M, Fujiwara K, Hada T, Ota Y, Kurotsuchi S, Kanao H, Andou M. Obstetric outcomes of patients undergoing total laparoscopic radical trachelectomy for early stage cervical cancer. <i>Gynecol Oncol</i> 2013;131: 83-86. | already included in Zhang review |
| Falconer AD, Ferns P. Pregnancy outcomes following treatment of cancer. <i>J Obstet Gynaecol</i> 2002;22: 43-44. | small study |
| Farthing A. Future fertility after conservation surgery for cervical cancer. <i>Br J Hosp Med (Lond)</i> 2006;67: 250-252. | full paper not available |
| Fuller C, Bale C, Bishop J, Cool P. Lesson of the month 2: Oncology, obstetrics and orthopaedics: an unusual partnership. <i>Clin Med (Lond)</i> 2016;16: 599-601. | case report |
| Gadducci A, Cosio S, Genazzani AR. Ovarian function and childbearing issues in breast cancer survivors. <i>Gynecol Endocrinol</i> 2007;23: 625-631. | narrative review |
| Gaudio, F., et al. Pregnancy rate and outcome of pregnancies in long-term survivors of Hodgkin's lymphoma. <i>Ann Hematol</i> , 2019. 98(8): p. 1947-1952. | small cohort study again exposure of chemo mainly in young age |
| Ginsburg ES, Yanushpolsky EH, Jackson KV. In vitro fertilization for cancer patients and survivors. <i>Fertil Steril</i> 2001;75: 705-710. | small and old study |
| Goldman M, O'Hair K. Women's health, breast health: a review of the gynecologic effects of breast cancer. <i>Obstet Gynecol Surv</i> 2009;64: 469-480: quiz 499. | INCLUDED FOR THE NARRATIVE SECTION ON PATIENT ASSESMENT |
| Goldman NA, Goldberg GL. Late recurrence of squamous cell cervical cancer in an episiotomy site after vaginal delivery. <i>Obstet Gynecol</i> 2003;101: 1127-1129. | case report |
| Goldrat O, Kroman N, Peccatori FA, Cordoba O, Pistilli B, Lidgaard O, Demeestere I, Azim HA, Jr. Pregnancy following breast cancer using assisted reproduction and its effect on long-term outcome. <i>Eur J Cancer</i> 2015;51: 1490-1496. | included in dabrosin systematic review |
| Gottschalk E, Mangler M, Schneider A, Koehler C, Lanowska M. Pregnancy after lymphadenectomy and neoadjuvant chemotherapy followed by radical vaginal trachelectomy in FIGO stage IB1 cervical cancer. <i>Fertil Steril</i> 2011;95: 2431.e2435-2437. | case report |
| Griesshammer M, Bergmann L, Pearson T. Fertility, pregnancy and the management of myeloproliferative disorders. <i>Baillieres Clin Haematol</i> 1998;11: 859-874. | non-systematic review |
| Gulati G, Zhang KW, Scherrer-Crosbie M, Ky B. Cancer and cardiovascular disease: the use of novel echocardiography measures to predict subsequent cardiotoxicity in breast cancer treated with anthracyclines and trastuzumab. <i>Curr Heart Fail Rep</i> 2014;11: 366-373. | narrative review |
| Gulati SC, Van Poznak C. Pregnancy after bone marrow transplantation. <i>J Clin Oncol</i> 1998;16: 1978-1985. | older review |
| Gupta S, Bagel B, Gujral S, Subramanian PG, Khattry N, Menon H, Nair R. Parenthood in patients with acute promyelocytic leukemia after treatment with arsenic trioxide: a case series. <i>Leuk Lymphoma</i> 2012;53: 2192-2194. | very small study |
| Gurjala AN, Nazerali RS, Salim A, Lee GK. World's First Baby Born Through Natural Insemination by Father With Total Phalloplasty Reconstruction. <i>Ann Plast Surg</i> 2016;76 Suppl 3: S179-183. | not relevant |
| Hafeez I, Lawenda BD, Schilder JM, Johnstone PA. Prolonged survival after episiotomy recurrence of cervical cancer complicating pregnancy. <i>Eur J Gynaecol Oncol</i> 2011;32: 211-213. | case report |
| Hahn HS, Yoon SG, Hong JS, Hong SR, Park SJ, Lim JY, Kwon YS, Lee IH, Lim KT, Lee KH et al. Conservative treatment with progestin and pregnancy outcomes in endometrial cancer. <i>Int J Gynecol Cancer</i> 2009;19: 1068-1073. | included in gunderson systematic review |
| Hahn, M., et al. Providing Patient-Centered Perinatal Care for Transgender Men and Gender-Diverse Individuals: A Collaborative Multidisciplinary Team Approach. <i>Obstet Gynecol</i> , 2019. 134(5): p. 959-963. | case report |
| Hall, E., K Robison, and K. Wohlrab. Pelvic floor disorders in women with gynecologic malignancy. <i>Curr Opin Obstet Gynecol</i> , 2018. 30(6): p. 446-450. | non-systematic review |
| Hammarberg K, Kirkman M, Stern C, McLachlan RI, Clarke G, Agresta F, Gook D, Rombauts L, Vollenhoven B, Fisher JRW. Survey of Reproductive Experiences and Outcomes of Cancer Survivors Who Stored Reproductive Material Before Treatment. <i>Hum Reprod</i> 2017;32: 2423-2430. | Includes also male sample, in addition does not give much info on the obstetrics outcomes but only on time to conceive and way to conceive. |
| Hammer RA, Urnes PD, Lurain JR. Unanticipated pregnancy with intrauterine growth retardation after radiation-induced ovarian failure. A case report. <i>J Reprod Med</i> 1996;41: 372-374. | already covered in the reviews |
| Hamy AS, Porcher R, Eskenazi S, Cuvier C, Giacchetti S, Coussy F, Hocini H, Tourmant B, Perret F, Bonflis S et al. Anti-Mullerian hormone in breast cancer patients treated with chemotherapy: a retrospective evaluation of subsequent pregnancies. <i>Reprod Biomed Online</i> 2016;32: 299-307. | INCLUDED FOR THE NARRATIVE SECTION ON PATIENT ASSESMENT |
| Han AR, Kwon YS, Kim DY, Kim JH, Kim YM, Kim YT, Nam JH. Pregnancy outcomes using assisted reproductive technology after fertility-preserving therapy in patients with endometrial adenocarcinoma or atypical complex hyperplasia. <i>Int J Gynecol Cancer</i> 2009;19: 147-151. | Included in Gunderson systematic review |
| Hartnett KP, Ward KC, Kramer MR, Lash TL, Mertens AC, Spencer JB, Fothergill A, Howards PP. The risk of preterm birth and growth restriction in pregnancy after cancer. <i>Int J Cancer</i> 2017;141: 2187-2196. | Full paper not available |
| Hatayama Y, Aoki M, Kawaguchi H, Hirose K, Sato M, Akimoto H, Tanaka M, Fujioka I, Ono S, Takai Y. Safe and successful birth following pelvic radiotherapy for rectal mucosa-associated lymphoid tissue lymphoma: a case report. <i>J Med Case Rep</i> 2017;11: 26. | Case report |
| Hensley ML, Ford JM. Imatinib treatment: specific issues related to safety, fertility, and pregnancy. <i>Semin Hematol</i> 2003;40: 21-25. | Already covered by Cortes 2015 |

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| Hensley ML, Reichman BS. Fertility and pregnancy after adjuvant chemotherapy for breast cancer. <i>Crit Rev Oncol Hematol</i> 1998;28: 121-128. | Old and not systematic |
| Herskovic E, Ryan M, Weinstein J, Wadhwani NR. Maternal to fetal transmission of cervical carcinoma. <i>Pediatr Radiol</i> 2014;44: 1035-1038. | Case report |
| Higgins S, Haffty BG. Pregnancy and lactation after breast-conserving therapy for early stage breast cancer. <i>Cancer</i> 1994;73: 2175-2180. | Too old, not relevant |
| Hirsch D, Levy S, Tsvetov G, Weinstein R, Lifshitz A, Singer J, Shraga-Slutzky I, Grozinski-Glasberg S, Shimon I, Benbassat C. Impact of pregnancy on outcome and prognosis of survivors of papillary thyroid cancer. <i>Thyroid</i> 2010;20: 1179-1185. | Very small series |
| Hoffkling A, Obedin-Maliver J, Sevelius J. From erasure to opportunity: a qualitative study of the experiences of transgender men around pregnancy and recommendations for providers. <i>BMC Pregnancy Childbirth</i> 2017;17: 332. | not for this question but perhaps this study is more appropriate for psychology/counselling questions |
| Holloman C, Carlan SJ, Sundharkrishnan L, Guzman A, Madruga M. Successful pregnancy after mucinous cystic neoplasm with invasive carcinoma of the pancreas in a patient with polycystic ovarian syndrome: a case report. <i>J Med Case Rep</i> 2017;11: 188. | Case report |
| Hosalkar HS, Henderson KM, Weiss A, Donthineni R, Lackman RD. Chemotherapy for bone sarcoma does not affect fertility rates or childbirth. <i>Clin Orthop Relat Res</i> 2004: 256-260. | Full paper not available |
| Hyoun SC, Obican SG, Scialli AR. Teratogen update: methotrexate. <i>Birth Defects Res A Clin Mol Teratol</i> 2012;94: 187-207. | Not relevant |
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Q23 How long should reproductive material (oocytes, embryos, ovarian tissue) be stored?

Collection of data

To answer this narrative question, information was collected on the duration of storage in European countries to a survey send to the ESHRE committee of national representatives. The methodology of the survey is included in annex 7