

Prophylactic Salpingectomy to Reduce the Risk of Cancer: Ethical Considerations

A Case

A 28-year-old patient is 25 weeks pregnant with her second child. She is scheduled for a C-section. She has two relatives who had ovarian cancer, one of whom passed away from the disease. She knows that this family history increases her risk of ovarian cancer.

Ovarian cancer grows slowly. Pre-invasive and early stage disease often go undetected. Many patients have malignancies more than four years before ovarian cancer is detected. By the time of diagnosis, the cancer is often advanced and aggressive growth has already occurred. As a result, the five year survival rate is only about 45 percent.

At her last appointment, the patient tells her OB that she read that removal of the fallopian tubes and the ovaries might help to prevent ovarian or breast cancer. The patient explains that she does not want removal of her ovaries, which will prematurely cause menopause; however, she asks whether she could undergo a risk-reducing salpingectomy (removal of the fallopian tubes) in conjunction with her C-section. She is very concerned about her risk of cancer and has become increasingly anxious about her health after the birth of her child. Although salpingectomy will cause sterilization, the patient accepts that she will not be able to have another child. She is most concerned about reducing her risk of ovarian cancer.

May a salpingectomy be performed in conjunction with a C-section to reduce the risk of cancer?

Ministry Perspectives

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Salpingectomy is a prophylactic, preventative or cautionary surgery to remove the fallopian tubes for women at high risk of ovarian cancer. Between 1 in 400 and 1 in 800 people in the U.S. population carry one of the causative mutations, and salpingectomy has become the “standard of care” in these cases.¹ Ovarian cancer is a significant issue in women’s health and the overall survival rate at five years is only about 45 percent. For women with increased risk of ovarian cancer, the lifetime risk ranges from 16 to 54 percent, and often involves an increased risk of breast cancer. Last year actress Angelina Jolie chose to have a double mastectomy and reconstructive surgery after learning she had an 87 percent risk of breast cancer because she carries the BRCA1 gene.²

Ovarian cancer is not a single disease process arising on a single site or from a single cell type. The most common subtype has been identified as serous

(epithelial ovarian cancer), and the fallopian tube is often the first place of involvement. This subtype is most commonly found in BRCA1/2 mutation carriers³ and up to 20 percent of these cancers occur in women with germ line BRCA1/2 mutations.⁴

A woman with BRCA mutations can chose risk-reducing surgery to excise her fallopian tubes and sometimes her ovaries (oophorectomy). When pathologically examined after surgery, about 10 percent of women undergoing salpingectomy were found to have an early cancer. The majority of early cancers were found in the distal fallopian tubes and not the ovaries. Due to its location in the fallopian tubes, the cancer metastasizes to the ovaries and surrounding pelvic structures.

While salpingectomy is standard medical treatment, is this surgery in line with Catholic moral teaching that places significant value on the preservation of the whole of the human person, stresses that a pathology must be present in order to remove an organ,⁵ views mutilation of a healthy organ as intrinsically evil,⁶ and condemns direct sterilization?⁷

Pope Pius XII delineates three conditions when it is permissible to remove a healthy organ:⁸ the functioning organ is causing serious damage or constitutes a menace to the whole organism; clear evidence confirms that the damage will be remediated or measurably lessened by the mutilation; and the negative effects of mutilation will eliminate the danger to the whole, ease the pain, or secure positive effects.⁹ In other words, a removal of a

healthy organ removes the “field of growth” and dramatically diminishes the risk of life-threatening disease.

Regarding prophylactic mutilation, Pius XII stated that “by virtue of the principle of totality and the right to use the services of the organism as a whole, each person can permit individual parts to be destroyed or mutilated when the good of the whole requires it. This may be done to ensure life, as well as to avoid or, naturally, repair serious and lasting damage that cannot be otherwise be avoided or repaired.”¹⁰ Healthy organs, therefore, may be removed for the good of the whole whenever their functioning poses a physical risk. The decisive moral element is that the preservation of the organ or its functioning poses a direct or indirect threat to the body.¹¹

Consequently, salpingectomy is morally permissible. Even though the surgery renders the generative faculty incapable of procreation, this is not its sole effect, or the primary intention. Rather, the act of removing the fallopian tubes (and sometimes ovaries) is in itself sufficient for a notable clinical benefit conferred directly to the patient and this constitutes the primary intention.

Categorizing salpingectomy a “drastic measure,” National Catholic Bioethics Center's Director of Education Fr. Tad Pacholczyk draws a helpful distinction between the importance that the integrity and order of the human body be respected and not unduly violated (the Principle of Integrity) and whether or not an individual organ or part of the human

body may be sacrificed for the continued survival of the whole person (the Principle of Totality). Salpingectomy lies "somewhere in the middle, with emphasis being placed upon the weightier Principle of Totality."¹²

Pacholczyk rightly concludes that a woman can surely make a prudential judgment that she carries a serious risk of breast cancer due to BRCA1/2 mutations, as well as considering other factors such as a strong family history of breast cancer, the absence of a full-term pregnancy, abortion or miscarriage in the first pregnancy, or a male relative who develops breast cancer.¹³

Salpingectomy is prudential management medical treatment and morally permissible surgery.

¹ Consult: Rachelle Barina, "Risk-Reducing Salpingectomy and Ovarian Cancer," *The National Catholic Bioethics Quarterly* 14:1 (2014), 67-79 and John F. Tuohey, "Surgical Prophylactics for Ovarian Cancer (SPOC): An Ethical Inquiry," *Linacre Quarterly* 65:3 (1998), 77-96.

² Jolie's mother and aunt both died of breast cancer. She chose this surgery as her risk of breast cancer was higher than her risk for ovarian cancer.

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<http://www.cancer.gov/cancertopics/factsheet/Risk/BRCA>

⁴ Gynecologic Oncology Statement Regarding Salpingectomy and Ovarian Cancer Prevention, November 2013, <https://www.sgo.org/linical-practice/guidelines/sgo-climnical-practice-statement-salpingectomy-for-ovarian-cancer-prevention/>.

⁵ NCCB, *Ethical and Religious Directives for Catholic Health Care Services* (ERDs), 2009, no. 53.

⁶ John Paul II, *Veritatis Splendor* (1993), no. 80. See also Thomas Aquinas, *Summa Theologiae* I-II, q. 65, a. 1.

⁷ ERDs, *op. cit.*, no. 53.

⁸ Barina, *op. cit.*, 72, referencing "Removal of a Healthy Organ" in *The Human Body*, Boston: Daughters of St. Paul, 1960, 277-279.

⁹ This same conclusion was reached by Thomas J. O'Donnell, "Definitive Pelvic Surgery: A Moral Evaluation," *Theological Studies* 22:4 (1961), 652-653.

¹⁰ Pope Pius XII, *AAS* 44 (1952), 782.

¹¹ See Gerald Kelly, S.J., "Pope Pius XII and the Principle of Totality," *Theological Studies* 16: 2 (1955), 373-396.

¹² Fr. Tad Pacholczyk, "'Drastic Measures' and Cancer Decisions," (November 7, 2014), <http://ncbcenter.org/page.aspx?pid=1101>.

¹³ See Victoria Colliver, "UCSF Study To Look at Effects of Premature Change As A Result of Preventive Breast or Ovary Removal," *Health*. SFChronicle.com and SFGate.com, November 19, 2014.

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The fear and emotional angst many women experience from a heightened risk of developing ovarian cancer can be overwhelming, especially if they have lost family members to this dreaded disease.

Since Catholic health systems carry a moral obligation to care for the whole person, attending to such fears and anxiety is essential when ministering to these patients. The difficult decisions these women and their families face requires our support and the best medical care we can offer. At the same time, Catholic ministries must respond in a way that ensures respect for human dignity and the whole human person, including the gift of fertility.

In light of this background, we consider prophylactic salpingectomy for a patient at increased risk of ovarian cancer. Pope Pius XII acknowledged that the Principle of Totality can justify removing a healthy organ if “its continued presence or functioning cause[s] either directly or indirectly a serious menace for the whole body.”¹ Applying this same principle, the *Ethical and Religious Directives for Catholic Health Care Services (ERDs)* states that “the functional integrity of the person may be sacrificed to maintain the health or life of the person when no other morally permissible means is available.”² Both of these sources are clear that the Principle of Totality does *not* apply to direct sterilization.³ However, we believe that prophylactic salpingectomy for patients at increased risk of ovarian cancer can rightly be characterized as an *indirect* sterilization, per the usual conditions of the Principle of Double Effect and Pius XII’s note on the Principle of Totality. Though sterility is foreseeable, it is an unintended secondary effect. Such effect is neither the direct object (proximate intention) of the salpingectomy nor the remote intention of the patient or

physician. Rather, its purpose is to reduce the risk of cancer in the face of danger. Finally, the sterilizing effect is not the cause or specific means used to reduce the risk of ovarian cancer.

Although prophylactic salpingectomy meets the first three conditions for double effect, it is more difficult to determine whether the good effect outweighs the bad. Attaining *absolute* certitude that the benefits of prophylactic salpingectomy are greater than the risks is not possible, nor required in the Catholic moral tradition. One need obtain only *moral* certitude, or the certitude of prudence. Burdens to consider in this analysis include the unintended effect of loss of child-bearing potential, the surgical risks, a continued risk of ovarian cancer due to the presence of the ovaries, a possible increase in risk for ectopic pregnancy, and bleeding from this highly vascularized tissue.⁴ Moreover, it is uncertain that she would actually ever develop ovarian cancer. This raises the question of whether the danger or risk constitutes a proportionate reason for undergoing the surgery.

The anxiety caused by an increased risk of ovarian cancer could limit a person’s moral resources. For example, a young mother might want to do everything within her power to see her children grow up. This psychological and social benefit, grounded in the real possibility she will develop cancer, are indicators of the increased burdens and risks that might justify undergoing the procedure. However, the same fear might motivate someone to request prophylactic surgery when less invasive interventions (e.g.

counseling, screening) may be more appropriate. The personal decision to proceed with prophylactic salpingectomy should occur on a case-by-case basis only after careful conversations between the patient and her physician.

Ultimately, obtaining moral certitude about this case would require detailed information about the patient's medical history, genetic testing, personal history, race and ethnicity, and other clinical risk criteria. Thus, we must assume we have moral certitude that the risk of developing cancer is high enough to outweigh the burdens of surgery and infertility but not the burdens of early menopause, else the ovaries would be removed too.

Further specification of what constitutes a proportionate reason in this case would aid in obtaining moral certitude. This case reveals a need for further consideration on the risk-benefit analysis for women at population risk of ovarian cancer. These considerations are vital for Catholic ministries to continue to uphold the dignity of all women at risk of ovarian cancer.

¹ Pope Pius XII, "Removal of a Healthy Organ" (October 8, 1953), *The Human Body: Papal Teachings*, pp.277-279.

² United States Conference of Catholic Bishops, *Ethical and Religious Directives for Catholic Health Care Services*, 5th ed, no. 29.

³ In "Removal of a Health Organ," Pope Pius goes on to say, "We would like, however, to draw your attention to an erroneous application of the principle of totality which we have enunciated. It not rarely happens that, either when gynecological complications demand an operation, or quite independently of such complications, the healthy fallopian tubes are removed or put out of action

[in order] to prevent any new conception and the grave dangers which could arise therefrom either to the health or life of the mother; these dangers arise from other unhealthy organs—kidneys, heart, lungs—whose condition would be aggravated in case of childbearing... The appeal to this principle here is unjustified..." (*op. cit.*) The *Ethical and Religious Directives* state, "Procedures that induce sterility are permitted when their direct effect is the cure or alleviation of a present and serious pathology and a simpler treatment is not available." (*op. cit.*, n. 53)

⁴ The last two risks are not specified in the clinical practice statements recommending prophylactic salpingectomy concurrent with an unrelated abdominal surgery; Society of Gynecologic Oncology, "SGO Clinical Practice Statement: Salpingectomy for Ovarian Cancer Prevention," November 2013. Society of Gynecologic Oncology of Canada, "GOC Statement Regarding Salpingectomy and Ovarian Cancer Prevention," September 2011.

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The moral question of whether risk-reducing salpingectomy (RRS) or risk-reducing salpingo-oophorectomy (RRSO) could be permitted as means of preventing ovarian cancer (OC) is a relatively new one. While *Ethical and Religious Directive (ERD)*, no. 53 prohibits "direct sterilization" and states that "[p]rocedures that induce sterility are permitted when their direct effect is the cure or alleviation of a present and serious pathology and a simpler treatment is not available¹, it does not address whether a currently non-pathological reproductive organ can be removed if there is evidence that it is likely

to endanger a woman's health or life, but is not (yet) presently and seriously pathological.

Not Illicit "Uterine Isolation"

The citation for ERD 53 suggests its scope. The footnote references sole document, the Congregation for the Doctrine of the Faith's 1993 "Responses on 'Uterine Isolation' and Related Matters," which addressed three questions that are morally distinct from RRS and RRSO: 1) a uterus could be removed if it poses an "immediate serious threat to the life or health of the mother" even though sterility may result; 2) a uterus may not be removed if it does not constitute "in itself a present risk to the life or health of the woman" AND the intention is "to prevent a possible future danger deriving from conception"; and 3) a tubal ligation or "uterine isolation" with the intention of "averting the risks of a possible pregnancy" is not permitted. The latter two are not permitted because "the described procedures do not have a properly therapeutic character but are aimed in themselves at rendering sterile future sexual acts freely chosen."² The current case study differs from the latter two scenarios in three ways: 1) a known "immediate serious threat to the life or health of the mother" does not yet exist, though there seems to be some evidence that the woman is at increased risk of experiencing a serious threat to her life or health;³ and 2) the fallopian tubes themselves may contain the risk; and 3) sterility is not the *means* by which risk to a woman's life would be averted but a *side effect* of a procedure directly aimed at

removing potentially life-threatening tissue.

Not "Direct Sterilization"

A "direct sterilization" is an action "whose sole, immediate effect is to render the generative faculty incapable of procreation."⁴ In RRS and RRSO for at-risk women carried out with a prophylactic intention, the sterilizing effect is *not* the sole, immediate effect; rather, there is a second concurrent effect of removing organic tissue that, regardless of the occurrence of pregnancy, threatens to endanger a woman's life or health.

Permissibility of Removing a Currently Non-Pathological Organ

That an organ is not currently pathological does not morally exclude its removal.⁵ Pope Pius XII invoked the Principle of Totality to justify removing a currently non-pathological organ,^{6,7} including in the context of a meeting with urologists concerned about the morality of castration to thwart prostate cancer.⁸ The tradition has also justified prophylactic removal of currently non-pathological appendices during other abdominal surgeries.⁹

Key to the application of the Principle of Totality is the existence of a proportionate reason for impairing functional integrity.¹⁰ The greater the impairment, the stronger the reason must be. It would be difficult to make this case for RRS and/or RRSO for women without an increased risk of ovarian cancer; however, it seems plausible in certain cases for at-risk women.

Requirements of the Principle of Double Effect

RRS and RRSO may be justified by the Principle of Double Effect if: 1) the moral object (removing organ[s] that poses a potential serious threat to life or health) is good or at least indifferent; 2) the good effect (reduced threat to life and health) and not the evil effect (sterility) is intended; 3) the good effect (reduced threat to life and health) is not produced by means of the evil effect (sterility); 4) there is a proportionately grave reason for permitting the evil effect.¹¹ The moral evaluation of RRS in our case study seems to hinge on the “proportionate reason” criteria. Among relevant factors are the life-threatening nature of OC; the difficulty in obtaining a timely diagnosis before the disease has become serious or deadly; the reliability of methods to predict increased risk of OC in light of the woman’s genetics, family history, and age; the average age of onset of OC; medical and surgical risks and benefits; the existence or lack of alternatives; the effectiveness of RRS and / or RRSO in reducing the risk of OC; a person’s duty as steward to preserve her life and health; her fertility; and her vocational responsibilities (such as that of a mother to care for her existing children). Beyond favorable medical and surgical risk / benefit ratios, there is no mathematical formula to determine whether a morally proportionate reason exists. Such discernment should be carried out on a case-by-case basis, with the most up-to-date medical available, and from the perspectives of the acting persons.

The Guiding Role of Prudence

Prudence may guide the conscience to act to preserve life and health in the face of a reasonable threat; it does not require a person to enter into a cancerous state before acting, particularly if waiting until the time of diagnosis to intervene could be fatal.

In the sacred relationship between physician and patient, the vulnerability of the pregnant woman should be acknowledged in the informed consent process. By nature, pregnancy puts a decision for RRS or RRSO accompanying a C-section on a timer, and caution is needed to avoid pressuring a woman to make this permanent decision before she has had adequate time to form her conscience. As a matter of prudence, she should be allowed sufficient moral space to consider how her current context (e.g. a particularly miserable pregnancy or young active children) may influence her readiness to accept that she will no longer be able to have another child or how a change in her context (e.g., the death of a child, widowhood and remarriage) may cause her to weigh the sterilizing side effect of the intervention differently. These contextual considerations are discerned by the woman herself and therefore should to be brought to light as part of the informed consent process.

A Catholic health care institution could encourage prudential discernment by making available genetic counseling¹² and ethics consultation¹³. To prevent abuse that could arise with an unregulated policy regarding RRS and RRSO, the Catholic

health care institution may consider requiring prospective and/or retrospective case review. To mitigate scandal, it should be prepared to explain the moral distinction between RRS/RRSO and direct sterilization.

¹ United States Conference of Catholic Bishops, *Ethical and Religious Directives for Catholic Health Care Services*, 5th ed. (Washington, D.C: United States Conference of Catholic Bishops, 2009), no. 53.

² Congregation for the Doctrine of the Faith, “Responses on ‘Uterine Isolation’ and Related Matters,” *AAS* 86 (1994): 820-821.

³ The case study itself does not indicate the risk in this particular woman in light of her reported family history. Here, the ethicist relies on medical judgment.

⁴ Congregation of the Doctrine of the Faith, “Responses to Questions Concerning *Quaecumque Sterilizatio*” *AAS* 68 (1976): 738-740, no. 1.

⁵ Thomas O’Donnell, S.J., “Definitive Pelvic Surgery: A Moral Evaluation,” *Theological Studies* 22, no.4 (December 1961): 652-653: “[W]ith regard to the removal of non-pathological tissue, there was a fairly widespread opinion in the past (based perhaps on a misinterpretation of St. Thomas’ treatment of mutilation) which demanded that an organ be diseased before its removal was justified. This is incorrect. It is a distinction not even mentioned by many of the standard moral theologians, and expressly denied by others, and is clearly incompatible with the following statement of Pope Pius XII in his address to the Twenty-seventh Annual Convention of Italian Society of Urologists.”

⁶ Pope Pius XII, “Address to the First International Congress on the Histopathology of the Nervous System,” (September 14, 1952): “Because [the person] is a user and not a proprietor, he does not have unlimited power to destroy or mutilate his body and its functions. Nevertheless, by virtue of the principle of totality, by virtue of his right to use the services of his organism as a whole, the patient can allow individual parts to be destroyed or mutilated when and to the extent necessary for the good of his being as a whole. He may do so to ensure his being’s existence and to avoid or,

naturally, to repair serious and lasting damage which cannot otherwise be avoided or repaired.” English translation available at <http://ncbcenter.org/page.aspx?pid=1238>. Here the words “ensure” and “to avoid” seem to suggest a prophylactic intervention.

⁷ Pope Pius XII, “Address the Twenty-sixth Congress of the Italian Association of Urologists,” *AAS* 45 (1953): 674–675: “Three conditions govern the moral licitness of surgical intervention which entails anatomical or functional mutilation. First, the continued presence or functioning of a particular organ causes serious damage to the whole organism or constitutes a threat to it. Secondly, the harm cannot be avoided or notably reduced except by the mutilation which, on its part, gives promise of being effective. Finally, one can reasonably expect that the negative effect—i.e., the mutilation and its consequences—will be offset by the positive effect: removal of danger to the entire organism, palliation of pain, etc. The decisive point here is not that the organ which is removed or rendered inoperative be itself diseased, but that its preservation or its functioning entails directly or indirectly a serious threat to the whole body. It is quite possible that, by its normal function, a healthy organ may exercise on a diseased one so harmful an effect as to aggravate the disease and its repercussions on the whole body. It can also happen that the removal of a healthy organ and the suppression of its normal function may remove from a disease—cancer, for example—its area for development or, in any case, essentially alter its conditions of existence. If no other remedy is available, surgical intervention is permissible in both cases.”

⁸ See *ibid.*

⁹ See Thomas J. O’Donnell, S.J., *Morals in Medicine*, (Westminster, MD: Newman Press, 1959), pp. 85-86.

¹⁰ See ERD 29, and Gerald Kelly, S.J., “Medical-Moral Problems,” (St. Louis: The Catholic Health Association of the United States and Canada, 1958), p. 36: “Since mutilations vary in degree, the reasons justifying them must also vary. The cure of a slight danger may justify a slight mutilation, whereas the removal of an important part or the suppression of an important function requires a very serious reason.”

¹¹ Joseph Mangan, "An Historical Analysis of the Principle of Double Effect," *Theological Studies*, 10 (February 1949): 43.

¹² See *ERD* 54.

¹³ See *ERD* 37.

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When this patient undergoes risk-reducing salpingectomy (RRS), the nature and purpose of the act is disease prevention. Although RRS will render her incapable of procreation, inducing sterility is not the purpose of the procedure or the intention of the patient in the case at hand. Consequently, I believe RRS constitutes a permissible, indirect sterilization for this high-risk patient.¹ Although a more thorough and systematic ethical reflection on the act of RRS is appropriate, I would like to focus this commentary on two long-term ethical considerations that become especially relevant if Catholic health care organizations are willing to perform RRS: 1) offering and/or recommending RRS, and 2) the meaning of pathology and other related concepts.

In the present case, this highly informed patient asks about RRS, which obscures the question of whether clinicians should offer or recommend RRS. Many patients with higher than average risk will not know about RRS. Moreover, people (including physicians) tend to understand and appreciate risk very poorly.² Concern about the potential risks of RRS persists,

and definitive data on its efficacy does not exist.³

Because these factors increase women's vulnerability, it is crucial to remember the implicit power that physicians hold. When a physician presents an option, many patients hear that option as a recommendation. While RRS may be morally permissible, I am concerned about expectations generated from physicians' support of risk-reducing procedures. Undertaking preventative care is generally seen as responsible patient behavior. While RRS obviously differs from routine preventative care, physician recommendations could contribute to a perception that RRS is the responsible reaction to evidence of inherited risk. The belief that undergoing a preventative procedure is a responsible act generates a subtle and implicit suggestion that most patients *should* undertake it. Although this sentiment is hard to control when physicians offer or recommend a procedure, it subtly pressures women into accepting an invasive surgery that is morally and clinically optional. In fact, evidence has already shown that many women feel a responsibility not only for knowing and sharing their genetic risk, but also undertaking actions to reduce their risk caused by inherited factors.⁴

Thus, conversations about how and when to counsel women about RRS are necessary. A population health approach to RRS might attempt to quantify and target patients for RRS. Considering Catholic teaching on bodily integrity and the possibility of generating a sense of preventative responsibility for inherited

risk, we should be wary of linking risk-reducing procedures and population health. Instead, Catholic health care organizations should enable conversation not only about if, when, and how to prudently and selectively discuss RRS, but also about how to prevent the spread of an implicit moral imperative that women at high-risk of ovarian cancer undergo RRS.

The case at hand also raises questions about the meaning of pathology. Per ERD 53, procedures that result in sterilization are allowable if their “direct effect is the cure or alleviation of a present and serious pathology and a simpler treatment is not available.”⁵ This directive was likely written without considering the difference between a harmful malignancy and high risk of malignancy. Should intrinsic risk and the possibility that a malignancy already exists be considered a pathology? Or, given new scientific information, should this language be revised? Austriaco argues that a genetic mutation is sufficient to consider reproductive parts “already diseased.”⁶ Performing RRS under the assumption that intrinsic risk is disease and/or pathology has far-reaching implications, including theological implications about human nature and embodiment. Even if we are confident that RRS is a permissible, indirect sterilization, we should think carefully before claiming RRS fits within the language of ERD 53. In dialogue with scientific perspectives, new theological scholarship needs to explore the differences between risk, disease, pathology, malignancy, and mutation.⁷ Personal, ecclesial, and organizational decisions about invasive responses to

hereditary risks depend upon these concepts and will profoundly influence our anthropology and ontology.

While many people might support a RRS for the patient under consideration, clinicians, ethicists, and organizations need to be cautious when approaching RRS on a wider-scale. The way that we approach RRS—clinically and conceptually—will have profound implications for our communities and patients.

I would like to thank Paul Scherz and Devan Stahl for helping me to develop my ideas about RRS.

¹ I have previously made a more lengthy argument in favor of permitting risk-reducing salpingectomy. See “Risk-Reducing Salpingectomy and Ovarian Cancer: Chasing Science, Changing Language, and Conserving Moral Content.” *The National Catholic Bioethics Quarterly*, 14 (1), Spring 2014.

² For example, see research by Gerg Gigerenzer described in *Risk Savvy: How to Make Good Decisions*. Penguin Group, 2014.

³ Tanner EJ¹, Long KC, Visvanathan K, Fader AN. “Prophylactic salpingectomy in premenopausal women at low risk for ovarian cancer: risk-reducing or risky?” *Fertility and Sterility*. 100(6), 2013.

⁴ For example, see Nina Hallowell’s article: “Doing the right thing: genetic risk and responsibility.” *Sociology of Health & Illness*. 21(5), Sept 1999. Hallowell interviewed 40 women who underwent genetic counseling for hereditary breast/ovarian cancer. She found that the women perceived a sense of responsibility to their family to undergo testing and manage risk, even when risk management practices involved negative side effects. She effectively argues that the construction of genetic risk is a deeply moral issue because of the way it forms the feelings and choices of women.

⁵ ERD 53 of the *Ethical and Religious Directives for Catholic Health Care Services*. 5th edition, 2009.

⁶ Nicanor Pier Giorgio Austriaco provides a helpful and scientifically adept Catholic moral discussion of risk-reducing procedures that result in sterilization in his book, *Biomedicine and Beatitude: An Introduction to Catholic Bioethics*. Catholic University of America Press, 2011. see pages 219-221. Quote from page 221.

⁷ This research should also examine if/how genetic risk factors differ from environmental or behavioral risk factors.