ISSN: 2469-5807

Palmieri et al. Int J Pathol Clin Res 2017, 3:056
DOI: 10.23937/2469-5807/1510056
Volume 3 | Issue 1
Open Access

International Journal of
Pathology and Clinical Research

REVIEW ARTICLE

The "Second Opinion Medical Network"

Palmieri B[1,2], Laurino C[1,2] and Vadalà M[1,2]*

[1]*Department of General Surgery and Surgical Specialties, University of Modena and Reggio Emilia Medical School, Surgical Clinic, Modena, Italy*

[2]*Second Opinion Medical Network, Modena (MO), Italy*

***Corresponding author:** *Vadalà Maria, Department of General Surgery and Surgical Specialties, University of Modena and Reggio Emilia Medical School, Surgical Clinic, Modena, Italy, Tel: +39-3397695748, E-mail: mary.vadala@gmail.com*

Abstract

The "Second Opinion Medical Network" is a consultation referral web and medical office system recruiting a wide panel of real-time available specialists, to whom any patient affected by any disease or syndrome and not satisfied with the diagnosis or therapy can apply for an individual clinical audit. Due to the physician-patient communication gap, most of the patients usually wander around the medical websites looking for proper answers to their health problems. However, this search often becomes compulsive and obsessive and frequently ambiguous and frustrating. Palmieri, et al. defines this borderline or even pathological behavior as the "Web Babel Syndrome"- psychological imbalance affecting young and elderly patients, often with multiple synchronous diseases receiving by their care givers heterogeneous and misleading informations or advices, as well as, confused, contradictory statements and prescriptions. To deal with this problem, the "Second Opinion Medical Network" aims to be a useful "problem-solving" support revisiting each conflictual diagnostic and therapeutic step and properly re-addressing tailored treatments and prognoses, preventing unnecessary investigations and unhelpful and expensive medical and surgical interventions.

The aim of this editorial is to describe the role and benefits of such a medical network in our web connected health care system.

Keywords

Second opinion, Network, Surgery, Cancer, Economy

Introduction

Patients seek a second medical opinion, often through the internet, when their diagnosis is uncertain or the therapeutic adopted option is uneffective, unpleasant, or risky [1,2].

In 2002, a survey of 4,530 people in Europe and USA showed that 32% of Europeans and 43% of Americans preferred to use health web sites, sponsored by BBC and Yahoo, for health information [3]. However, the internet sites are often lacking of adequate information concerning disease complications and aftercare [4]. This web-searching behaviour is often continuous, compulsory, somehow obsessive, leading to the "Web Babel Syndrome", defined as a physician-patient communication gap frequently occurring when the patient affected by multiple synchronous pathologies, feeds back heterogeneous and misleading informations and prescriptions with the risk to drop in a confusionary state [5-8].

In 1999, the Institute of Medicine report cited fatal medical errors in some 40,000-98,000 Americans PER year [8] supporting once more the concept that a further consultation or specialistic second opinion may be useful antidote to lethal misdiagnosis [9].

The term "second opinion" has been widely reported also in histology [10,11] and pathology (e.g. thyroid pathology) [12-20] where the diagnosis is often difficult, misunderstood and strongly based on the healthcare professionals' experience. It has been defined as a qualified, interdisciplinary medical opinion, based on medical evidence, of an experienced medical specialist or a team [21]. An effective and helpful second opinion strategy in various pathologies (e.g. oral pathology) is the use of smartphones and software applications, such as WhatsApp Messenger, a crossplatform mobile messaging application that allows the exchange of text messages, images, audio, and video messages using

Citation: Palmieri B, Laurino C, Vadalà M (2017) The "Second Opinion Medical Network". Int J Pathol Clin Res 3:056. doi.org/10.23937/2469-5807/1510056

Received: November 11, 2016: **Accepted:** June 02, 2017: **Published:** June 05, 2017

Internet connection [22]. This application promotes a 'PATIENTS group chat', to communicate and share images and videos over a common interface. For instance, WhatsApp has been used in traumatology cases to set an initial diagnosis and classification of tibial plateau fractures during emergency surgery so as to search instantaneous and adequate advice regarding plastic and reconstructive surgery [23-25].

However, the "Second Opinion Medical Network" often represents a multiconsult useful decision-support tool not only in order to achieve a re-evaluation of the patient's case with a consequent optimization of treatment and prognosis [1,8,26-28], but also to avoid unnecessary surgery and costs [29-33]. It involves a wide panel of specialists (including skilled and trained biologists or biotechnologists who can technically support the clinicians) to which patients affected by different synchronous or metachronous diseases not adequately satisfied in terms of diagnosis and treatment can interview for a clinical update. The Network analyzes the clinical profile of patient, using the web consultation, but also the public and private healthcare resources, available in the geographic area where the patient lives, and after having carefully reviewed the reliability of the diagnostic algorithm follows up the patient during the advanced therapeutic steps, giving him adequate counseling, either by phone or email, until the patient reaches the clinical satisfactory goal: health recovery or quality of life improvement [7]. It takes care of multiple emergent clinical problems and recruits in real time of a wide heterogeneous diagnostic panel of specialists simultaneously.

The specialists selection is based on personal knowledge, screening of individual CV, PubMed publications and specific expertise on selected cohorts of medical and surgical patients, with the final outcome, represented Institutions; also the biologists staff is very much helpful in the problem solving flow chart: they usually hold a bachelor of science a doctorate (PhD) and/or a clinical lab oriented master; thus displaying the necessary scientific background to work, side by side, with a clinical team, not only being directly involved in proper diagnostic procedures but also keeping the contacts with specialistic diagnostic centers to monitor the quality of the results. They increase the quality and efficiency of the Network, holding the responsibility of the clinical researches and case reports to be published on peer reviewed medical journals too. They are also responsible for monitoring the clinical outcome on new drugs (especially those under experimental phase 1 or 2 clinical trials) for proper cases recruiting, screening also all the nutraceutical products available on the market, for a proper indication if use; as a matter of fact complementary & alternative medicine is more and more required by the patient frustrated by the conventional treatments with synthetic drugs and registered specialties. A continuous web screening and scouting of public and private centers and specialists is mandatory to satisfy the patients' requirements, on the basis of quality, scientific level and specialist field. The Network enclosed also trained nurses, to meet the patients, in the outpatient's office arrange the medical consultation and take care of the inside patients' write the history, and follow up, to achieve a full service profile.

The "Second Opinion Medical Network" is useful on the following specific clinical settings [7,34]: 1) Oncology: to meet an update of ongoing therapeutic new weapons, to discuss the compatibility and indication of complementary alternative medicine, to review the histopathology background, to suggest sub-invasive instrumental or multimodal palliation etc; 2) Complex-multipathology clinical background: when a dedicated team of specialists is required at the virtual web bedside to face different clinical problems in the same patients; 3) Surgery: especially when a radical therapeutic option, with a high morbidity and potential mortality risk, is being recommended, but with some doubts about its benefits; 4) Failure in the physician-patient relationships: especially when many specialists have been consulted along the time with doubtful conflicting opinions on the best management of the patient; 5) When the patient cannot resign that nothing more can be done, and asks for having reviewed his situation; 6) Lack of communication between physician and patient, lack of mutual empathy, and frustration; these are significant reasons from the patient point of view to seek additional consultation; 7) Multimedia often incautious advertising about new drugs or/and curative new strategies when the patient holds expectations or illusion to be recruited for be cured at some specific medical centers; 8) Forensic claims for medical mistakes or malpractice.

The "Second Medical Opinion Network" in Histopathology

Second opinion diagnosis is a crucial aspect of daily practice for histopathologists worldwide. Usually, the slides and tissue blocks are exchanged for second opinion as the pathologist prefers to view the slides in real time, and these clinical practices often lead to diagnostic delay, which could prove critical in cases of malignant lesions [35,36].

Villanacci and coworkers assessed 32 suspected diagnoses of Barrett syndrome (with and without dysplasia) via the transmission of histological sections from 10 general pathology units to one single unit in which an expert pathologist reviewed the slides blindly [37]. The findings confirmed that: 1) In the 78% of cases there was diagnostic discordance, in the specific the presence of low grade dysplasia was not confirmed in the 64% of the cases; 2) The 28% of cases with the original diagnosis were reclassified as non-Barrett' patients.

Sarode, et al. studied the effectiveness of WhatsApp application in the field of oral pathology for second

opinion on histopathological diagnosis [38]. Thirty indian oral pathologists are divided in two groups: Group A composed by 10 pathologists, to which was assigned the work of capturing representative images from the binocular compound microscope, using the smartphone camera, and sending them (using WhatsApp) for second opinion diagnosis, to other 20 oral pathologists (group B). The photomicrographs were accompanied by a short clinical and demographic description of the patient, including age, sex, clinical manifestations. The pathologists of group B received 247 cases (e.g. odontogenic tumors, malignant epithelial tumors, salivary gland neoplasms) for second opinion, that after were compared with the original final diagnoses. The group B gave correct second opinion for more than 96% of the cases. The findings confirmed also a positive correlation between correct second opinion and age (P = 0.0143) and experience (P = 0.0189) of the pathologist. The time required for second opinion ranged from 7 to 478 min, in spite of the necessary time in the conventional method that depends from the availability, appointment, and location of the pathologist.

Similar studies on large diagnostically difficult sample size are need, just as smartphones with more sophisticated version of cameras that can capture morphological features with great details are need, to facilitate more accurate diagnosis on the second opinion substituting the conventional slide viewing modus operandi.

The "Second Medical Opinion Network" in Pathology Diagnosis

A review of "second opinion" findings at the Johns Hopkins Hospital (Baltimore, USA) evidences that: 1) 6,171 cases are reviewed and the "second opinion" surgical pathology diagnoses issued resulted in 86 (1.4%) major diagnostic changes; 2) Misdiagnosis of the serosal surface lesions (9.5%) and the female reproductive tract (5.1%) are statistically more likely to occur [39]. A pilot study on "second opinion teleconsulting" in an outpatient setting at the Dep. of Dermatology, University of L'Aquila (Aquila, Italy) in collaboration with the Dep. of Dermatology, Medical University of Graz (Graz, Austria) used a Store-and Forward (SAF) web based system to assess the value of teleconsultation, as an addition to the conventional face-to-face visit, in patients with unusual and diagnostically difficult dermatoses [40]. In 10/33 cases (30.3%), the correct diagnosis is made using teleconsultation only. This study represents as "second opinion teleconsulting" can be an effective tool in the diagnosis of numerous challenging inflammatory and neoplastic skin diseases.

The good ethical practice states that the patient is supposed to notify to his family physician the reasons of diagnosis or treatment failure. Unfortunately when, after a few attempts to achieve an effective treatment, the patient dissatisfaction reaches the edge, a barrier rises between the patient and the physician who finds himself frustrated by the failure of the relationship with his patient. In this situation, the patient starts seeking on own a "second opinion" to improve his health status or reach a better life quality. The physician-patient relationship might be improved by a second consultation, running further clinical or diagnostic tests or trying new therapeutic options together. If we consider that many specialists can be eligible for a "second opinion" consultation, private and public hospitals, clinics and practices should organize audit "second opinion teams" offering adequate logistics and organization support for the most effective possible care.

Second Medical Opinion Network in Oncology

Despite the existing practice guidelines and oncological conferences, cancer patients and their family members ask frequently for a second opinion, IN diagnosis or treatment assessment by a second, independent physician [41-43]. Indeed, a survey on 617 breast cancer patients underlined that 94% of these patients want an independent opinion from another expert about treatment options [44].

The majority of oncologists evaluate monthly between 1 and 5 patients for second opinions and roughly one third of patients with advanced cancer seek the second medical opinion, to improve at least patient-physician communication, enhanced information, and reassurance [42, 45-47].

A prospective study (administration of electronic survey) on 65 oncologists revealed that 82% of these specialists have 1-2 second opinion encounters for month [48]. The oncologists reported also the consultation figures: 83% were careful not to criticize the primary doctor, 72% would not highlight their mistakes, and 52% would modify their recommendations according to the primary diagnosis. The dynamics in giving "second medical opinion" are influenced by the collegiate relationships of the doctors. Almost 2/3 of the oncologists believed that the first physician's treatment and recommendations influenced the outcome of the second opinion and more than 1/3 believed the outcome is influenced by the relationship between the two physicians.

Greenfield, et al. found that the majority of physicians report that they understand patients' reasons for seeking another opinion and state that they are not disappointed or hurt [49]. Nevertheless, this topic is not always discussed in the communication between a patient and the primary caregiver [50]. In Germany, practice guidelines for certification of breast cancer centers in North Rhine-Westphalia require physicians to inform patients about the possibility of seeking another opinion [51]. However, study results revealed that only about 35% of the patients in breast cancer centers in North Rhine-Westphalia stated that they had been informed about such a possibility [52].

Staradub, et al. through the re-examination of pathology slides of patients with breast cancers, underlined significant discrepancies in the diagnoses, leading to additional prognostic information in 40% of cases and confirming the benefit of a pathology second opinion to determine also the appropriate surgical approach [53]. Another recent study, confirmed a meaningful discrepancy between the original histopathological diagnosis and the second opinion in a cross-sectional study of 209 lesions received in consultation at the "Breast Pathology Laboratory of the School of Medicine" of the Federal University of Minas Gerais (Brazil) [54]. Elmore, et al. observed in simulation study, reductions ($p < 0.001$) in both over-interpretation and under-interpretation of breast pathology, in 240 breast biopsy specimens reviewed by 115 pathologists for second opinion [55].

Another research group showed the utility of second opinion through the re-evaluation of needle biopsies of 535 men referred for radical prostatectomy; among these biopsies, initially diagnosed as prostate adenocarcinoma, seven (1.3%) down staged to benignity, with obvious implications on treatment [30]. Bajaj and coworkers [27] performed a study of 922 cases of thyroid Fine Needle Aspiration (FNA), cytology slides, referred to their Institution over a 2-year period, to assess the magnitude of discrepancies and determine the clinical impact of second opinion: 33 cases underwent a change in treatment upon "second opinion".

Park, et al. [28] designed a study to determine the impact of secondary review of Thyroid Fine Needle Aspiration (FNA) biopsy on surgical management by assessing the frequency of discordant diagnoses. FNA biopsy, indeed, which is a rapid and cost-effective test, recommended as primary diagnostic approach of thyroid nodules, is a worldwide approved screening test to distinguishing neoplastic from non-neoplastic nodules and to select proper surgical cases. 1,499 patients were enrolled and diagnostic disagreement enclosed 394 cases (26.3%). By the second opinion consultation, 65 (4.5%) patients were readdressed to the proper management. Recently it has been demonstrated the importance of a reinterpretation of imaging studies of head and neck cancer on 94 cases which led to more accurate staging of cancer resulting in a change of management plan in 38% of patients and in a better treatment decision-making [56]. Several previous studies had found significant discrepancy rates in diagnoses or staging re-evaluation of these cancers subsequently modifying the surgical procedure and patients' care [57-59]. Zan and coworkers, for instance, found in 347/4,534 cases relevant clinical different criteria from the first to the second diagnosis: most of them were discrepancies in detecting abnormalities rather than interpreting the identified findings. Second-opinion consultation was more accurate in 84% of cases [60].

In a recent qualitative study (March 2017), 23 patients with localized or advanced prostate cancer (that sought second opinion because they were uncertain about treatment decision, communication physician-patient, etc) were interviewed by phone about their motivations and experiences with seeking second opinions and the uncertainties they experienced [61]. The findings evidenced that the uncertainty is reduced by the second opinion process for most patients, while in contrast for others, it increased or was sustained. This evolution depended on how patients' information needs or desire for decisional guidance was addressed, or the degree to which the physician providing the second opinion shared their level of uncertainty.

In Germany, the high rate of discrepancies between the first and second opinion in more than 30% of patients with testicular cancer delivered to the creation of second-opinion network for testicular cancer that is an internet-based platform addressing physicians to offer a second opinion, such as further therapy after orchiectomy and completion of staging [62].

Economic Impact of the "Second Opinion Medical Network"

Following the "Second Opinion Medical Network" the physician is less exposed to legal claims and the patient achieves the best treatment with saving significant amounts of money for healthcare organizations [1]. In statistical study, a second opinion consultation program was evaluated in Massachusetts Hospital. From 2,284 patients previously addressed to surgical procedure, 336 were not confirmed, with an estimated saving of $534,791 versus the program cost of $203,300 [29]. Recently, second opinion has become an increased patient need in the self-referral health informations pool available on the web; thus, easy access to a second opinion consulting medical office avoids the unpleasant subjective misunderstanding and confusion that we nicknamed, "the Web Babel Syndrome". Also requirements for a second opinion on a complex pathologic diagnosis have largely increased At the Ohio State University, Selman and coworkers underlined the critical role of gynecologic-oncologic histopathology second opinion review. In 14 out of 295 cases the changes in diagnoses resulted in a modification of the prognostic outcome. The cost of specimen reviewing was approximately $39,235 with financial advantages over the social health costs [32]. An evaluation of cost effectiveness of a second opinion for pathology prior to surgery was undertaken by Epstein and colleagues in 1996 [30]. 535 needle biopsies initially diagnosed as adenocarcinoma of the prostate were reviewed, and 7 (1.3%) downstaged to benignity. Reviewing all 535 biopsies cost approximately $44,883 whereas radical prostatectomies cost $85,686.

A study on 922 cases of thyroid fine needle aspiration cytology slides over a 2-year period assessed the clinical impact of second opinion: 33 patients underwent a change in treatment upon second opinion. The second opinion of these 922 cases resulted in a cost saving of $940,166 [27].

In conclusion, second opinion referrals are expanding into the web, not only for diagnostic confirmations, but also to identify the best suitable and qualified treatment centers, and/or to supply the patients with the most effective medical drugs, even if in phase one to experimental trials. This strategy will be socially and economically effective, because the "Second Opinion Medical Center" recruits the most excellent medical web experts, with a wide and deep network of National and International consultants. Furthermore, the patient's physical and psychological profile ought strongly to imprint the consultation background, and be taken into account in the decision making process, to avoid dissociation between the health needs and the human, and clinical support; indeed the puzzling issue of a difficult diagnosis, or an "orphan treatment" has to be psychologically supported by physician counseling.

Discussion and Conclusions

The request of the second opinion is increasingly, although precise data on frequency are lacking [63]. The "Second medical opinion Network" is an innovative tool for patients to actively seek information and be involved in their therapeutic treatment. The demand for such active involvement in medical decisions progressively increased over the years [42,64]. Several studies suggest that about 68% of patients seek a second opinion, so that would get another diagnosis or prognosis, and 65% would assurance regarding the diagnosis or treatment options [44,47,65-67]. Furthermore, the patients might seek another opinion to discuss their diagnosis and/or treatment, especially when they are dissatisfied with the first physician [45,47,63,65,68].

The main surveys between the patients revealed that the main reasons for not seeking a second opinion are: 1) The fear of upsetting or disappointing the treating family physicians. This fear may lead patients to avoid discussing the topic with their physician, misleading the physician-patient relationship in the long term; 2) A potential conflict when discrepancies exist between the first and second opinion [49,64].

Nevertheless, the second opinion may offer several benefits to patients: 1) It can reduce anxiety or increase their sense of control; 2) It may lead to a more precise diagnosis or better care [65,69].

In conclusion, the role of "Second Opinion Medical Network" in healthcare is significant for high quality patient care by improving the estimation of prognosis and determining the appropriate therapeutic yield. It is also relevant to know something about expectations and patients' satisfaction on "second opinion". Investigating these aspects in groups of patients who get a neurological second opinion, it was found out that a day-care admission for neurological second opinion leads to an increase of patient satisfaction, irrespective of making a new diagnosis or initiation of a new treatment advice. Interestingly, satisfaction was related to the amount of information and emotional support provided by the neurologist during the day-care admission [45,47,70-73]. Another finding is that the psychological relevance of second opinion led to a short-term increase in patient satisfaction, but, after two years, satisfaction had decreased to the level seen prior to the second opinion; the benefit of second opinion consultations seems to be reasonable in the short term, but limited in the long term [74].

The "Second Opinion Medical Network" is a common step for many patients requiring a deeper further revision of their clinical conditions, an update of diagnosis and a possible new previously un-attempted therapeutic strategy in the hopeful perspective of a better prognosis or life quality. This further consultation has to meet not only the psychological support criteria of such delicate physician-patient ethical relationship, but also a widespread knowledge of the safety and reliability of unconventional treatments that very often are self administered without any expert medical advice. The hospitals and medical centers should therefore provide adequate staff of specialists constantly interacting in such re-evaluation auditing, lead by an older supervisor in the role of "liason" among the team members [75]. The Web will be also a relevant partner in this procedure, because the patients consult it any time, very often, without any expert background and they will ask many questions to the doctors based on this information preview. Finally, further research on this topic should focus not only on patients' perspectives, but might also offer guidance to patients and physicians to better facilitate the second opinion process.

References

1. Vashitz G, Davidovitch N, Pliskin JS (2011) Second medical opinions. Harefuah 150: 105-110, 207.
2. Wagner TH, Wagner LS (1999) Who gets second opinions? Health Aff (Millwood) 18: 137-145.
3. Eaton L (2002) News roundup: A third of Europeans and almost half of Americans use Internet for health information. Brit Med J 989.
4. Nassab R, Hamnett N, Nelson K, Kaur S, Greensill B, et al. (2010) Cosmetic tourism: public opinion and analysis of information and content available on the Internet. Aesthet Surg J 30: 465-469.
5. Di Cerbo A, Pezzuto F, Laurino C, Palmieri B (2014) Web Babel Syndrome and false expectations during own multimedia oncological search. Clin Ter 165: e225-e229.
6. Palmieri B, Iannitti T, Capone S, Fistetto G, Arisi E (2011) Second opinion clinic: is the Web Babel Syndrome treatable?. Clin Ter 162: 575-583.
7. Palmieri B, Iannitti T (2011) The Web Babel syndrome. Patient Educ Couns 85: 331-333.
8. Palmieri B, Capone S, Fistetto G (2011) Second opinion consultation: is Babel-web syndrome curable?. Recenti Prog Med 102: 43.
9. Tomaszewski JE, Bear HD, Connally JA, Epstein JI, Feldman M, et al. (2000) Consensus conference on second

opinions in diagnostic anatomic pathology. Who, What, and When. Am J Clin Pathol 114: 329-335.

10. Lueck N, Jensen C, Cohen MB, Weydert JA (2009) Mandatory second opinion in cytopathology. Cancer 117: 82-91.

11. Symmers WS Sr (1968) Survey of the eventual diagnosis in 226 cases referred for a second histological opinion after an initial biopsy diagnosis of reticulum cell sarcoma. J Clin Pathol 21: 654-655.

12. Warnick P, Bahra M, Andreou A, Neuhaus P, Glanemann M (2010) Second-look operation in pancreatic carcinoma previously assessed as unresectable. Zentralbl Chir 135: 70-74.

13. Cook IS, McCormick D, Poller DN (2001) Referrals for second opinion in surgical pathology: implications for management of cancer patients in the UK. Eur J Surg Oncol 27: 589-594.

14. Salles MA, Sanches FSF, Perez AA, Gobbi H (2008) Importance of a second opinion in breast surgical pathology and therapeutic implications. Rev Bras Ginecol Obstet 30: 602-608.

15. Lehnhardt M, Daigeler A, Hauser J, Puls A, Soimaru C, et al. (2008) The value of expert second opinion in diagnosis of soft tissue sarcomas. J Surg Oncol 97: 40-43.

16. Jara-Lazaro AR, Thike AA, Tan PH (2010) Diagnostic issues in second opinion consultations in prostate pathology. Pathology 42: 6-14.

17. Jones K, Jordan RC (2010) Patterns of second-opinion diagnosis in oral and maxillofacial pathology. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 109: 865-869.

18. Wayment RO, Bourne A, Kay P, Tarter TH (2011) Second opinion pathology in tertiary care of patients with urologic malignancies. Urol Oncol 29: 194-198.

19. Hahm GK, Niemann TH, Lucas JG, Frankel WL (2001) The value of second opinion in gastrointestinal and liver pathology. Arch Pathol Lab Med 125: 736-739.

20. Kronz JD, Westra WH (2005) The role of second opinion pathology in the management of lesions of the head and neck. Curr Opin Otolaryngol Head Neck Surg 13: 81-84.

21. Groß SE, Hillen MA, Pfaff H, Scholten N (2017) Second opinion in medical encounters - A study among breast cancer patients. Patient Educ Couns.

22. Sarode GS, Sarode SC, Patil S (2016) Messenger services on smartphone: changing trends of communication in dental practice. J Contemp Dent Pract 17: 267-269.

23. Giordano V, Koch HA, Mendes CH, Bergamin A, de Souza FS, et al. (2015) WhatsApp Messenger is useful and reproducible in the assessment of tibial plateau fractures: inter- and intra-observer agreement study. Int J Med Inform 84: 141-148.

24. Johnston MJ, King D, Arora S, Behar N, Athanasiou T, et al. (2015) Smartphones let surgeons know WhatsApp: an analysis of communication in emergency surgical teams. Am J Surg 209: 45-51.

25. Wani SA, Rabah SM, AlFadil S, Dewanjee N, Najmi Y (2013) Efficacy of communication amongst staff members at plastic and reconstructive surgery section using smartphone and mobile WhatsApp. Indian J Plast Surg 46: 502-505.

26. Al-Maghrabi JA, Sayadi HH (2012) The importance of second opinion in surgical pathology referral material of lymphoma. Saudi Med J 33: 399-405.

27. Bajaj J, Morgenstern N, Sugrue C, Wasserman J, Wasserman P (2012) Clinical impact of second opinion in thyroid fine needle aspiration cytology (FNAC): A study of 922 interinstitutional consultations. Diagn Cytopathol 40: 422-429.

28. Park JH, Kim HK, Kang SW, Jeong JJ, Nam KH, et al. (2012) Second opinion in thyroid fine-needle aspiration biopsy by the Bethesda system. Endocr J 59: 205-212.

29. Ruchlin HS, Finkel ML, McCarthy EG (1982) The efficacy of second-opinion consultation programs: A cost-benefit perspective. Med Care 20: 3-20.

30. Epstein JI, Walsh PC, Sanfilippo F (1996) Clinical and cost impact of second-opinion pathology. Review of prostate biopsies prior to radical prostatectomy. Am J Surg Pathol 20: 851-857.

31. Di Cerbo A, Palmieri B (2012) The economic impact of second opinion in pathology. Saudi Med J 33: 1051-1052.

32. Selman AE, Niemann TH, Fowler JM, Copeland LJ (1999) Quality assurance of second opinion pathology in gynecologic oncology. Obstet Gynecol 94: 302-306.

33. Allen TC (2013) Second opinions: pathologists' preventive medicine. Arch Pathol Lab Med 137: 310-311.

34. Wunsch A, Palmieri B (2013) The role of second opinion in oncology: an update/Ruolo del "secondo parere" in oncologia: un aggiornamento. European Journal of Oncology 18: 117-122.

35. Allison P, Locker D, Feine JS (1998) The role of diagnostic delays in the prognosis of oral cancer: a review of the literature. Oral Oncol 34: 161-170.

36. Sarode SC, Sarode GS, Karmarkar S (2012) Early detection of oral cancer: detector lies within. Oral Oncol 48: 193-194.

37. Villanacci V, Salemme M, Stroppa I, Balassone V, Bassotti G (2017) The importance of a second opinion in the diagnosis of Barrett's esophagus: a "real life" study. Rev Esp Enferm Dig 109: 185-189.

38. Sarode SC, Sarode GS, Anand R, Patil S, Unadkat H (2016) WhatsApp is an effective tool for obtaining second opinion in oral pathology practice. J Oral Pathol Med 46: 513-519.

39. Kronz JD, Westra WH, Epstein JI (1999) Mandatory second opinion surgical pathology at a large referral hospital. Cancer 86: 2426-2435.

40. Lozzi GP, Soyer HP, Massone C, Micantonio T, Kraenke B, et al. (2007) The additive value of second opinion teleconsulting in the management of patients with challenging inflammatory, neoplastic skin diseases: a best practice model in dermatology? J Eur Acad Dermatol Venereol 21: 30-34.

41. Bayliss R (1988) Second opinions. Br Med J (Clin Res Ed) 296: 808-809.

42. Tattersall MH, Dear RF, Jansen J, Shepherd HL, Devine RJ, et al. (2009) Second opinions in oncology: the experiences of patients attending the Sydney Cancer Centre. Med J Aust 191: 209-212.

43. Nederland Z (2015) Second opinion in de zorgverzekeringswet.

44. Oskay-Ozcelik G, Lehmacher W, Könsgen D, Christ H, Kaufmann M, et al. (2007) Breast cancer patients' expectations in respect of the physician-patient relationship and treatment management results of a survey of 617 patients. Ann Oncol 18: 479-484.

45. Philip J, Gold M, Schwarz M, Komesaroff P (2010) Second medical opinions: the views of oncology patients and their physicians. Support Care Cancer 18: 1199-1205.

46. van Dalen I, Groothoff J, Stewart R, Spreeuwenberg P, Groenewegen P, et al. (2001) Motives for seeking a second opinion in orthopaedic surgery. J Health Serv Res Policy 6: 195-201.

47. Mellink WAM, Dulmen AMV, Wiggers Th, Spreeuwenberg PMM, Eggermont AMM, et al. (2003) Cancer patients seeking a second surgical opinion: results of a study on motives, needs, and expectations. J Clin Oncol 21: 1492-1497.

48. Philip J, Gold M, Schwarz M, Komesaroff P (2011) An exploration of the dynamics and influences upon second medical opinion consultations in cancer care. Asia Pac J Clin Oncol 7: 41-46.

49. Greenfield G, Pliskin JS, Feder-Bubis P, Wientroub S, Davidovitch N (2012) Patient-physician relationships in second opinion encounters - the physicians' perspective. Soc Sci Med 75: 1202-1212.

50. Schmidmaier R (2006) Cancer--the desire for a second opinion is prompted by a need for orientation. MMW Fortschr Med 148: 31-33.

51. Ärztekammer Westfalen-Lippe, V.z.Z.v.B, i NRW, Practice guidelines for certification of breast cancer centers in north Rhine-Westphalia.

52. SE Groß, MA, H Pfaff (2016) Results of a Patient Survey for Breast Cancer Patients in Breast Cancer Centers in North Rhine-Westphalia 2016, Institut für Medizinsoziologie, Versorgungsforschung und Rehabilitationswissenschaft (IMVR). Ergebnisse der Patientinnenbefragung in den Brustzentren Nordrhein-Westfalens 2016.

53. Staradub VL, Messenger KA, Hao N, Wiley EL, Morrow M (2002) Changes in breast cancer therapy because of pathology second opinions. Ann Surg Oncol 9: 982-987.

54. Perez AA, Balabram D, Salles Mde A, Gobbi H (2013) Consultation in breast surgical pathology: interobserver diagnostic variability of atypical intraductal proliferative lesions. Rev Bras Ginecol Obstet 35: 164-170.

55. Elmore JG, Longton GM, Carney PA, Jackson SL (2016) Evaluation of 12 strategies for obtaining second opinions to improve interpretation of breast histopathology: simulation study. BMJ 353: 3069.

56. Lysack JT, Hoy M, Hudon ME, Nakoneshny SC, Chandarana SP, et al. (2013) Impact of neuroradiologist second opinion on staging and management of head and neck cancer. J Otolaryngol Head Neck Surg 42: 39.

57. Loevner LA, Sonners AI, Schulman BJ, Slawek K, Weber RS, et al. (2002) Reinterpretation of cross-sectional images in patients with head and neck cancer in the setting of a multidisciplinary cancer center. AJNR Am J Neuroradiol 23: 1622-1626.

58. Wheless SA, McKinney KA, Zanation AM (2010) A prospective study of the clinical impact of a multidisciplinary head and neck tumor board. Otolaryngol Head Neck Surg 143: 650-654.

59. Viertel VG, Babiarz LS, Carone M, Lewin JS, Yousem DM (2012) Quality control in neuroradiology: impact of trainees on discrepancy rates. AJNR Am J Neuroradiol 33: 1032-1036.

60. Zan E, Yousem DM, Carone M, Lewin JS (2010) Second-opinion consultations in neuroradiology. Radiology 255: 135-141.

61. Hillen MA, Gutheil CM, Smets EMA, Hansen M, Kungel TM, et al. (2017) The evolution of uncertainty in second opinions about prostate cancer treatment. Health Expect.

62. Schrader M, Zengerling F, Hakenberg OW, Protzel C (2016) German national second-opinion network for testicular cancer and penile carcinoma: Two sources for evidence-based information. Urologe A 55: 1192-1198.

63. Sutherland LR, Verhoef MJ (1994) Why do patients seek a second opinion or alternative medicine? J Clin Gastroenterol 19: 194-197.

64. Tam KF, Cheng DK, Ng TY, Ngan HY (2005) The behaviors of seeking a second opinion from other health-care professionals and the utilization of complementary and alternative medicine in gynecologic cancer patients. Support Care Cancer 13: 679-684.

65. Moumjid N, Gafni A, Bremond A, Carrere MO (2007) Seeking a second opinion: do patients need a second opinion when practice guidelines exist? Health Policy 80: 43-50.

66. Mordechai O, Tamir S, Weyl-Ben-Arush M (2015) Seeking a second opinion in pediatric oncology. Pediatr Hematol Oncol 32: 284-289.

67. Okamoto S, Kawahara K, Okawa A, Tanaka Y (2015) Values and risks of second opinion in Japan's universal healthcare system. Health Expect 18: 826-838.

68. Hillen MA, Medendorp NM, Daams JG, Smets EMA (2017) Patient-driven second opinions in oncology: A systematic review. Oncologist.

69. Axon A, Hassan M, Niv Y, Beglinger C, Rokkas T (2008) Ethical and legal implications in seeking and providing a second medical opinion. Dig Dis 26: 11-17.

70. Mellink WA, Henzen-Logmans SC, Bongaerts AH, Ooijen BV, Rodenburg CJ, et al. (2006) Discrepancy between second and first opinion in surgical oncological patients. Eur J Surg Oncol 32: 108-112.

71. Ong LM, Visser MR, Lammes FB, de Haes JC (2000) Doctor-patient communication and cancer patients' quality of life and satisfaction. Patient Educ Couns 41: 145-156.

72. Wieske L, Wijers D, Richard E, Vergouwen MD, Stam J (2008) Second opinions and tertiary referrals in neurology: a prospective observational study. J Neurol 255: 1743-1749.

73. Wijers D, Wieske L, Vergouwen MDI, Richard E, Stam J, et al. (2010) Patient satisfaction in neurological second opinions and tertiary referrals. J Neurol 257: 1869-1874.

74. Wieske L, Vergouwen MD, Wijers D, Stam J, Smets EM, et al. (2011) Limited benefit of diagnostic second opinions in a neurology department. Ned Tijdschr Geneeskd 155: 3542.

75. Orgerie MB, Duchange N, Pélicier N, Rosset P, Lemarié E, et al. (2012) Multidisciplinary meetings in oncology do not impact the physician-patient relationship. Presse Med 41: e87-e94.