Radiography xxx (xxxx) xxx

Contents lists available at ScienceDirect

Radiography

journal homepage: www.elsevier.com/locate/radi

The radiographer's perspective on X-ray examinations in potentially pregnant patients; results of a focus group study among Dutch radiographers

F. Wit [a], C.C.J.J. Vroonland [a, *], H. Bijwaard [a, b]

[a] Inholland University of Applied Sciences, Haarlem, the Netherlands
[b] National Institute for Public Health and the Environment, Bilthoven, the Netherlands

ARTICLE INFO

Article history:
Received 26 March 2021
Received in revised form
17 September 2021
Accepted 20 September 2021
Available online xxx

Keywords:
Pregnancy
Focus group
X-ray
Radiology
Guideline

ABSTRACT

Introduction: The Netherlands does not have a national guideline for performing radiographic examinations on pregnant patients. Radiographic examination is a generic term for all examinations performed using ionizing radiation, including but not limited to radiographs, fluoroscopy and computed tomography. A pilot study amongst radiographers (Medical Radiation Technologists (MRTs)) showed that standardized practice of radiographic examinations on pregnant women is not evident between Radiology departments and that there is a need for a national guideline as the varying practice methods may lead to confusion and uncertainty amongst both patients and MRTs.

Methods: Focus groups consisting of MRTs from several Radiology departments within the Netherlands were used to map ideas and requirements as to what should be included in the national guideline. Nine focus group sessions were organized with a total of 52 participants. Using a previous review (Wit, Fleur; Vroonland, Colinda; Bijwaard H. Pre-natal X-ray exposure and the risk of developing paediatric cancer; a systematic review of risk factors and a comparison of international guidelines. Health Physics 2021; 121 (3):225–233), the following key points were chosen as discussion topics for the focus group sessions: dose reduction, confirming pregnancy and risk communication.

Results: Results showed that the participating MRTs did not agree on the use of lead aprons. That the national guideline should include standardized methods to adjust parameters to decrease radiation dose. Focus group participants find it difficult to ask a patient's pregnancy status, especially when dealing with relatively young and old (er) patients. When communicating the level of risk associated with a radiographic examination the participating MRTs would like to be able to use examples and comparisons, preferably by means of a multilingual website.

Conclusion: A national guideline must include information on justification, available alternatives, dose reductions methods and confirmation of pregnancy requirements when fetal dose is a significant risk.

Implications for practice: A national guideline ensures standardized practice can be implemented in Radiology departments, increasing clarity of the issues for both patients and MRTs.

Introduction

In the middle of the 20th century the first results were published showing prenatal exposure to radiographs can result in the development of cancer in children.[1] Many other studies showing this relationship followed, and as a result, there is increased apprehension in performing diagnostic radiographic examinations on pregnant patients. The radiation dose a fetus receives from radiographic examinations is so low that teratogenic effects need not be considered[2] since these can only occur above 100–200 mSv according to the International Commission on Radiological Protection (ICRP) report 84.[3] In this respect, radiographic examinations includes all examinations performed using ionizing radiation.

Internationally, multiple guidelines for imaging pregnant patients with ionizing radiation have been formulated. Most of these guidelines are based on the International Commission on Radiological Protection (ICRP) report 84.[3–10] Several publications

* Corresponding author. Inholland University of Applied Sciences, Bijdorplaan 15, 2015 CE, Haarlem, the Netherlands.
E-mail address: colinda.vroonland@inholland.nl (C.C.J.J. Vroonland).

https://doi.org/10.1016/j.radi.2021.09.011
1078-8174/

describe the usefulness and necessity of these guidelines.[11–14] In addition, requirements for radiological examinations of pregnant patients have been laid down in European legislation.[15] These requirements encompass mandatory enquiries regarding pregnancy status by practitioners, justification and optimization of radiographic examinations, and public notices to be displayed to increase an individual's awareness of considerations regarding radiographic examinations during pregnancy.

The Netherlands has similar to other EU countries translated the legal requirements into national law. However, in contrast to surrounding countries, the Netherlands does not have a national guideline detailing more practical issues, although some instructions can be found through the Dutch Radiologists Association (Nederlandse Vereniging voor Radiologie (NVvR)).[16] Most radiographic examinations are performed by Medical Radiation Technologists (MRTs) under the supervision of Radiologists. A pilot study among MRTs to inquire about their experiences of performing radiographic examinations on pregnant patients showed that 80% of respondents image pregnant patients and 96% of respondents described a need for a national guideline.[17]

Subsequently, as a part of the pilot study, ten MRTs were interviewed. They showed and experienced an insufficient knowledge of the radiation risks associated with radiographic examinations on pregnant patients.[17]

This results in apprehension amongst MRT's, which is amplified by the non-standardized practice in departments.[17] Patients are also aware of these differences and that, combined with an MRT who is not able to accordingly answer their questions, results in anxiety which in turn is seen in the questions raised by pregnant patients on internet forums.[18]

A research-project was started due to the results of the pilot study.

The first element of this project was a systematic literature review of recent risk coefficients and guidelines.[19] Based on this review the following key points were chosen to be used in the focus group sessions:

- dose reduction in pregnant patients,
- establishing pregnancy status and how to confirm pregnancy when in doubt,
- communicating the risk of the fetus developing malignancy with pregnant patients.

Methods and materials

The goal of this study is to give insight into the requirements and ideas of MRTs as to what should be included in the national guideline on radiographic examinations in pregnant patients. Qualitative cross-sectional research was chosen in the form of focus group sessions with MRTs. The participants of the focus groups were asked by means of a consent form for permission for audio recording of the session. On the consent form participants were asked to be discreet with the information they heard during the session and could choose whether they wished to be kept informed of the progress of the study. Data from the focus group sessions was processed anonymously; participants and their characteristics are represented with a combination of letters. This data remains with the researcher and is not for distribution. According to Dutch law, medical ethical approval is not required for this research. Ethical approval is only required when participants are to undergo medical procedures.[20]

Nine focus group sessions, with a total of 52 participants, were held and divided into the north, west and south of the Netherlands. Each group consisted of a maximum of 10 MRTs currently working in Radiology, with at least 6 months' work experience and experience with pregnant patients. The participants are employed in a total of 34 institutes; 6 academic and 28 peripheral. Each institute consisted of or had access to a radiographic imaging room, CT and emergency rooms. Work experience varied from just over 6 months to a maximum of 42 years.

The three aforementioned key points, used as discussion topics during the sessions, were derived from the literature review. The focus group was also comprised of a group leader, an assistant and a minutes secretary. Each session was recorded on audio and lasted 2 ½ hours.

Each key point was clarified by the group leader with the help of several examples/results from the literature review. The key points and their examples and/or results were printed and distributed among the participants for reference during the focus group session. After clarification, the participants were asked to share their own experiences with regards to the key points. Subsequently the participants were asked to write and share their requirements and ideas for the guideline on sticky notes, giving the participants the time to put their final thoughts and ideas onto paper. The sticky notes were collected and the results of each key point discussed within the session.

Participant's travel costs were reimbursed and each received a gift card with a €25,- value. Focus group participants were recruited through the project teams network and by personally contacting MRT-student supervisors within Radiology departments to promote participation amongst their colleagues. All audio files, consent forms and transcripts of the sessions have been saved and stored on the InHolland University server. All notes and remarks made by focus group participants have been made anonymous for research purposes.

Data-analysis

Data analysis was divided amongst the three universities of applied sciences participating in this study. ATLAS.ti version 8.3.17 (Scientific Software Development GmbH, Berlin, Germany) coding software was used. Fig. 1 represents the concept model used during the selective coding process, showing that experiences with one or multiple key points results in needs. These needs such as protocols and/or knowledge are requirements that should be included in the national guideline.[21]

Results

The first key point during the focus group sessions was dose reduction and use of a lead apron became a subject raised in this discussion. Supporters among the participants mentioned being

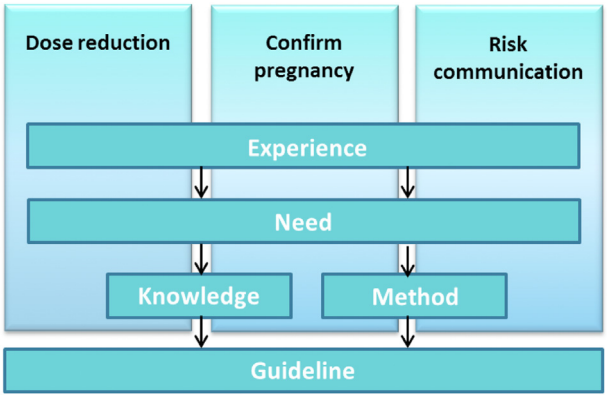

Figure 1. This concept model shows that MRT experiences with one or multiple key points results in needs which should be included in the national guideline.

able to provide the patient with an increased feeling of safety and/or not being willing to discuss non-use of a lead apron with the patient.

"In the radiographic imaging room when imaging extremities, we give patients a lead apron for reassurance, and even though we also say that it's really only for 'show', only then are they convinced no radiation will reach the baby."

Opponents stated that using a lead apron actually increases the patients perception of risk and standardized practice should not include the utilization of means which do not (physically) have a protective effect.

"There's a sign in our department which actually states that we do not provide lead aprons because they increase the perception of risk."

Subsequently methods of adjusting (standardized) imaging protocols was discussed. Many MRTs indicated that if it's possible to adjust imaging protocols in pregnant patients to decrease the radiation dose, then these protocols should be used in all patients (as ALARA applies to all patients). For these MRTs, this is a reason to not change standardized imaging protocols. Others stated regularly adjusting the field of view (FOV), minimizing for a CT-thorax and increasing the FOV when radiographing other areas so as to not miss critical information which may require an radiograph to have to be repeated. In addition, other methods for dose reduction were discussed. Such as alternative breathing instructions, paying extra attention to FOV position, pitch etc… Participants stated the need to increase their knowledge of dose reduction techniques and/or having these included in the national guideline.

"I think if you suddenly have to think about dose reduction for a pregnant woman, then you're ignoring all other patients. I wouldn't change too much. Because if you adjust something and the image isn't good enough, you have to take it again. Just stick to the old ways and in any case take care."

The last subject addressed within the dose reduction key point was ALARA and justification of exposure to ionizing radiation. Participants believe examinations are often requested and performed without apparent justification. For example; a rib radiograph taken 3 weeks post trauma or arthrosis imaging requested by a general practioner (GP) which is often re-requested by the orthopedist. In such cases there is an increased level of awareness from the participants, and when justification is questionable a radiologist or the requesting physician is consulted.

"In general, I think we are stricter with ALARA, but more in the form of, is the examination really justified? I think we look at that a lot and have the option to discuss this with the radiologist."

The second key point during the focus group sessions was confirmation of pregnancy. The first issue raised was who is responsible for establishing pregnancy status and especially, in which patient group(s) this needed to be determined. The European Basic Safety Standard and the Dutch Standard Safety Norms Radiation Protection (Besluit Basisveiligheidsnormen Stralingsbescherming, BBS) both state that the requesting physician and radiologist are both responsible for the radiographic examination, seemingly also making them responsible for establishing pregnancy status.[15,22] Focus group participants believe the requesting physician should establish a patients' pregnancy status but also cannot rely sufficiently therein so as not to feel the need to confirm again prior to performing the examination. There is a preference to only establish pregnancy status when performing abdominal examinations. Actually enquiring about pregnancy is something many MRTs find difficult: when having to ask younger or older patients, also some patients may be insulted as if it is being insinuated that they are overweight. Pop-up functions within hospital software ensuring pregnancy status is determined prior to imaging are insufficient according to participants, as these are easily ignored.

"In RIS, or the hospital information system. Then there may be an illness or particulars mentioned. Hypersensitivities, pregnancy, you can click on everything. As soon as a patient knows she is pregnant, you can put it in the system. But someone has to do that. It must be reported."

"And if you're already known in the system and you were there a month ago, what does that currently say about your pregnancy?"

"A: I always have to apologize when I ask. There are always people who are a bit bigger.

B: Yes exactly. I've had someone like… Are you pregnant? And they were so offended. Yeah … sorry"

Another issue participants struggled with was what to do when a patient is uncertain about their pregnancy status. In these cases, most participants preferred consulting a radiologist or the requesting physician. However some participants wanted to be able to provide the patient with a pregnancy test. Predominantly in current practice, a radiologist or the requesting physician is consulted.

"And I think if it is in the FOV at some point, then I think it is very important not to decide it by myself, but rather to discuss it with the radiologist."

The last key point discussed was risk communication. Participants indicated this is an issue they struggle with, partially due to insufficient knowledge of the associated radiation risks and furthermore, finding it difficult to assess what the patient can and/or cannot understand. Most participants would prefer to be able to refer a patient to a website where they can also find information they themselves may require. The website must be multilingual and include useful examples and comparisons for reference.

"So I find that quite difficult, I do think you should mention that the risks are there, but how extensively are you going to tell them because if you hear it in itself it's quite complex. I recently reread it again and then you think oh yes, that's it, it is complicated and not so easy to explain to your patient. And then hope that they understand."

"A: maybe a general digital folder that you as an MRT could look up, that you can show the patient.

D: a guideline must also be clear for the patient and be the same in every hospital."

During the focus group meetings, it emerged that the warning signs do not always have the desired effect. Patients sometimes don't seem to see them

"I think we should do something about those signs because just like you say, you have to contradict something that is very clearly indicated everywhere. That doesn't inspire a lot of confidence, so I think, which maybe isn't wise either, but if those signs weren't there

Figure 2. Example of a warning sign often used in Radiology departments.

then you can start with a more open form of communication. Your information already has an effect. If it says 'Pregnant? Report it!' and 'No imaging if you're pregnant", and then we have to say, 'No, don't worry, it's fine', then I think that's quite difficult.'

Discussion

The issues that were raised during the focus group meetings of this study have been based on the outcomes of an extensive literature review.[19] This review showed that dose reduction, establishing pregnancy status and risk communication are important topics in recent literature covering radiological examinations of pregnant patients. These topics were used to guide the focus group discussions. This ensured that at least these topics were covered, but discussions were allowed to diverge in order to identify other potential issues.

Regarding the dose reduction issue, participants would like the national guideline to include a standardized list of methods for dose reduction. These methods must be applicable independent of the brand of radiography equipment and be able to be incorporated into a departments imaging protocol. Another option would be to produce a department specific list overseen by the local Medical Physicist working in conjunction with the MRT's.

Despite most participants' willingness for a uniform procedure with regards to the use of the lead apron, there is no consensus about what should be incorporated therein. Generally the participants do not want to offer a lead apron, however a few participants are willing to make an exception for patients that request one. This matches the advice given by McCollough: a lead apron is not necessary but may be used outside of the abdomen for reassurance.[5] The IAEA (International Atomic Energy Agency (IAEA)) however advises not to provide a lead apron following ICRP 84.[3,9]

Focus group participants also stated that current warning signs increase anxiety in patients. See Fig. 2 for an example. The IAEA recently developed new signs for Radiology and Nuclear Medicine departments which are more explanatory and less of a deterrence, as demonstrated in Fig. 3.[23]

Radiophobia is a huge challenge for MRTs as they are confronted by a patients doubts and fears when performing an examination. Focus group participants find this a tricky subject to inform the patient about as theoretical radiation risk information is quite complicated, especially to a layman. Participants would like to be able to have access to numeric information regarding risks however would prefer to use comparisons and examples when informing a patient.

The World Health Organisation (WHO) published the report 'Communicating radiation risks in paediatric imaging' in 2016.[24] Despite this report being on communicating with children and their parents, the advice therein is useful when informing

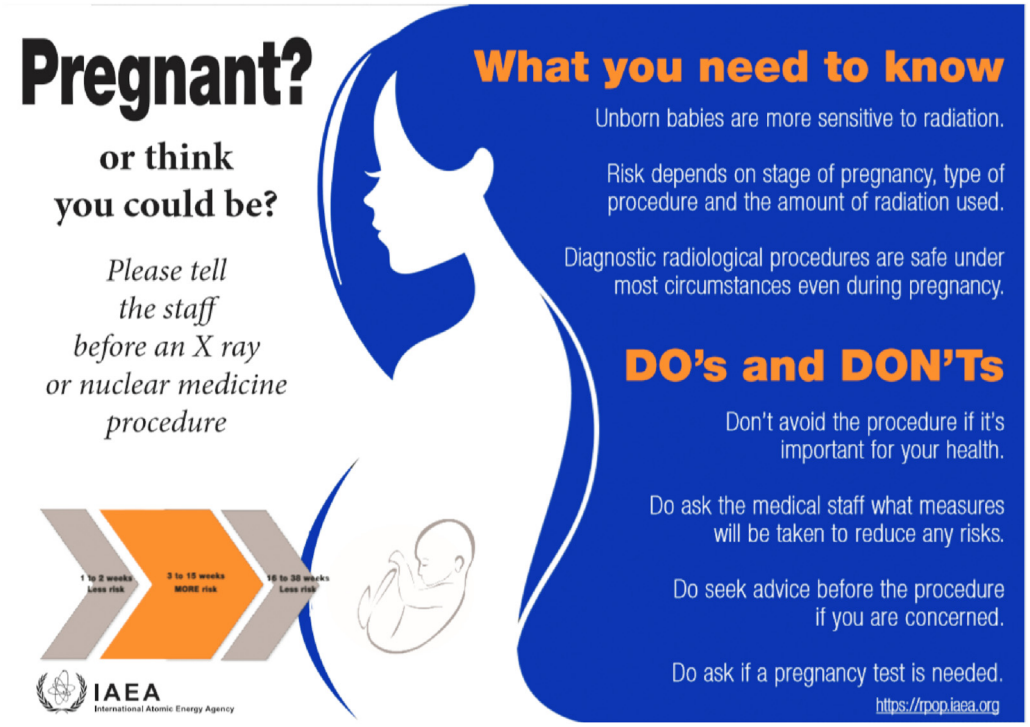

Figure 3. New warning sign developed by the IAEA for Radiology an Nuclear Medicine departments.[23]

Stakeholder: parents Anticipated question: How much radiation will my child receive from this head CT?		
Key message 1	**Key message 2**	**Key message 3**
This CT is recommended now to aid in diagnosis and guide the treatment of your child	Your child will receive the lowest possible dose without decreasing the diagnostic quality of the images	This CT is medically indicated and will be properly done, thus the benefits will outweigh the radiation risks
Supporting information 1-1	**Supporting information 2-1**	**Supporting information 3-1**
We have evaluated the clinical condition of your child and agreed that we need to confirm the diagnosis to make a decision about the treatment (examples/stories)	There are many techniques to lower the dose without compromising the diagnosis (examples, visual communication)	The radiation dose will be small, similar to several months of exposure to natural background radiation (analogies, tables, visual communication)
Supporting information 1-2	**Supporting information 2-2**	**Supporting information 3-2**
We have considered alternative tests and agreed that this is the examination indicated for your child (referral guidelines)	This imaging facility uses equipment, protocols and techniques suitable for children (accreditation, audits)	The radiation risk is low and the likelihood of an adverse outcome (cancer risk) will be nearly the same as it is for any other child: lifetime cancer incidence risk of 35-40% (analogies, tables, pictorial resources for visual communication)
Supporting information 1-3	**Supporting information 2-3**	**Supporting information 3-3**
This examination has to be done now to avoid any delay in the treatment, in case the diagnosis is confirmed (examples, scientific data)	This facility periodically compares its doses with national and international reference values and stays within those ranges (paediatric DRLs)	The CT will be interpreted by imaging specialists trained to identify abnormalities and their significance. The report will be communicated to the referring physician who will make decisions about treatment and follow-up (stories, examples)

Figure 4. Example of 'message mapping' from 'Communicating radiation risks in paediatric imaging'.[24]

expectant parents. The WHO indicates that both the (medical) advantages of performing the examination and the risks must be communicated. This means that properly informing the patient will cost more time. None of the participants considered this an issue, mainly as it will not be required often. Besides that, adjusted settings to reduce dose must be discussed with the help of examples and comparisons so as to communicate the risk.

The WHO advises minimizing the use of complex risk factors and numbers, also remarking that the risks are not to be trivialized. The MRT needs to anticipate each patient's needs, some patients want to know everything whereas in others, this can lead to anxiety. The WHO uses 'message mapping', an aid developed in the 90's for risk communication to the public. The most important communication points ('key messages') are outlined with supporting information in a table as can be seen in Fig. 4.[24]

Prior to risk communication and/or shielding, the patients pregnancy status must first be established. Participants state that this is a tricky question to ask, especially when a patient is younger than 20 or above 45 years old.

The Donaldson publication shows that caregivers in the United Kingdom (UK) also find it difficult to inquire about a possible pregnancy, especially with adolescents.[25] This coincides with the results of the focus groups where participants find it difficult to inquire about pregnancy status and often only ask when distinguishing features are seen. Donaldson states that the current UK guideline is to inquire if menarche has started and if so, a pregnancy test is routinely performed. This in turn presents issues with gaining and granting consent for the test. The extent of this issue in the Netherlands is not as great as in the UK: 3 in 1000 adolescents become pregnant in the Netherlands, whereas in the UK this is 38.3 in 1000.[26]

Conclusion

The focus group sessions produced the following conclusions.

Lead apron use: Participating MRTs would like uniformity regarding this issue, however consensus was not reached regarding whether a lead apron should or shouldn't be provided.

The principle of justification: Participants often question the justification of a radiographic examination. As a result the national guideline must include information on justification, available alternatives and ideally also be accessible for referring physicians.

ALARA and adjusting imaging parameters and FOV: Focus group participants stated a need for the national guideline to include a list of dose reduction methods and their effect for CT-examinations.

Confirmation of pregnancy: Participating MRTs stated that both the referring physician and the MRT performing the examination should be responsible for establishing pregnancy status.

In which age category: Initially determine if menarche or menopause has started after which pregnancy status can be inquired about. The resulting age category is between 9 and 50 years of age.

Which examinations: Focus group participants prefer only to be required to inquire about pregnancy status if fetal dose is a significant risk.

Requirements when pregnancy status is uncertain: Participants disagreed on this issue, however it was agreed that the referring physician must have an active role herein.

Style and contents of information: The participants would like to have a national multilingual website containing information regarding the risks of ionizing radiation to the fetus. Participants would like to be able to have access to numeric risk information, however would prefer comparisons and examples when informing a patient.

The effect of warning signs in waiting areas: Participants would like different warning signs to be used (Fig. 3) or current warning signs to be deployed differently.

Conflict of interest statement

None.

Acknowledgements

This research was partly funded by the Dutch Taskforce for Applied Research (SIA) which is part of the Netherlands Organisation for Scientific Research (NWO).

We would like to thank all our focus group participants for sharing their experiences and stories in their free time.

References

1. Tirada N, Dreizin D, Khati NJ, Akin EA, Zeman RK. Imaging pregnant and lactating patients. *Radiographics* 2015;**35**(6):1751–65. https://doi.org/10.1148/rg.2015150031.
2. ACOG. ACOG committee opinion No. 728 summary: müllerian agenesis: diagnosis, management, and treatment. *Obstet Gynecol* 2018. https://doi.org/10.1097/AOG.0000000000002452.
3. International Commission on Radiological Protection. ICRP 84: pregnancy and medical radiation. *Ann ICRP* 2000;**30**(1):1–43. iii–viii.
4. Chen MM, Coakley FV, Kaimal A, Laros RK. Guidelines for computed tomography and magnetic resonance imaging use during pregnancy and lactation. *Obstet Gynecol* 2008:333–40. https://doi.org/10.1097/AOG.0b013e318180a505.
5. McCollough CH, Schueler BA, Atwell TD, Braun NN, Regner DM, Brown DL, et al. Radiation exposure and pregnancy: when should we be concerned? *Radiographics* 2007. https://doi.org/10.1148/rg.274065149.
6. Williams PM, Fletcher S. Health effects of prenatal radiation exposure. *Am Fam Physician* 2010;**82**(5):488–93.
7. FDA. X-Rays, Pregnancy and you. FDA. Available from: https://www.fda.gov/radiation-emitting-products/medical-x-ray-imaging/x-rays-pregnancy-and-you.
8. Brent RL. Saving lives and changing family histories: appropriate counseling of pregnant women and men and women of reproductive age, concerning the risk of diagnostic radiation exposures during and before pregnancy. *Am J Obstet Gynecol* 2009;**200**(1):4–24. https://doi.org/10.1016/j.ajog.2008.06.032.
9. IAEA. *Radiation protection in radiology*. Available from: https://www.iaea.org/resources/rpop/health-professionals/radiology. [Accessed 14 September 2018].
10. National Council on Radiation Protection and Measurements. *Report No. 174 – preconception and prenatal radiation exposure : health effects and protective guidance*. 2013.
11. Bakker OJ, Go PMNYH, Puylaert JBCM, Kazemier G, Heij HA. Guideline on diagnosis and treatment of acute appendicitis: imaging prior to appendectomy is recommended. *Ned Tijdschr Geneeskd* 2010;**154**:A303.
12. Richtlijn LRCB. *zwangeren*. Available from: https://www.lrcb.nl/download/richtlijn-zwangeren/. [Accessed 19 August 2018].
13. FANC. *Medische blootstellingen van zwangere patiëntes*. Available from: https://fanc.fgov.be/nl/professionelen/medische-professionelen/radiologische-toepassingen/medische-blootstellingen-van. [Accessed 19 August 2018].
14. Ministerium Frauen Gesundheit. *Schwangerschaft und Röntgenuntersuchungen – ein Leitfaden für die radiologische Praxis*. 2017.
15. Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom,[n.d].
16. NVvR. *Nederlandse vereniging voor Radiologie*. Available from: https://www.radiologen.nl/nvvr. [Accessed 10 September 2021].
17. Bijwaard H. *RAAK-publiek*. Haarlem: REVIVE; 2017.
18. Dalmaijer Mrm FJE, Bijwaard H, Wit F, Vroonland Cjj PL. Risicocommunicatie over mogelijke effecten van röntgenstraling tijdens de zwangerschap: ervaringen van vrouwen. *NVMBR Mag* 2021;**6**–**14**.
19. Wit F, Vroonland CCJJ, Bijwaard H. Prenatal X-ray exposure and the risk of developing pediatric cancer—a systematic review of risk markers and a comparison of international guidelines. *Health Phys* 2021;**121**(3):225–33. https://doi.org/10.1097/HP.0000000000001438.
20. onderzoek Uw. *WMO-plichtig of niet? onderzoekers centrale commissie mensgebonden onderzoek*. Available from: https://www.ccmo.nl/onderzoekers/wet-en-regelgeving-voor-medisch-wetenschappelijk-onderzoek/uw-onderzoek-wmo-plichtig-of-niet. [Accessed 10 September 2021].
21. Baarda B, Bakker E, Fisher T, Julsing M, Peters V V van der T. *Basisboek kwalitatief onderzoek (basics qualitative research)*. Houten: Noordhoff Uitgevers; 2013.
22. Autoriteit NVS. *Besluit basisveiligheidsnormen stralingsbescherming*. 2018.
23. IAEA. *Posters and leaflets about radiation protection*. Available from: https://www.iaea.org/resources/rpop/resources/posters-and-leaflets#1. [Accessed 15 March 2019].
24. World Health Organisation. Communicating radiation risks in paediatric imaging. *WHO* 2016:22–31.
25. Donaldson JF, Napier SJ, Ward-Jones M, Wheeler RA, Spargo PM. Checking pregnancy status in adolescent girls before procedures under general anaesthesia. *Arch Dis Child* 2012;**97**(10):895–8. https://doi.org/10.1136/archdischild-2011-301229.
26. CBS. *Relatief weinig tienermoeders in Nederland. Centraal Bureau voor de Statistiek*. Available from: https://www.cbs.nl/nl-nl/nieuws/2017/50/relatief-weinig-tienermoeders-in-nederland. [Accessed 10 April 2019].