

BMJ Open

BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (<http://bmjopen.bmj.com>).

If you have any questions on BMJ Open's open peer review process please email info.bmjopen@bmj.com

BMJ Open

Does multidisciplinary videoconferencing between a head and neck cancer centre and its partner hospital add value to their patient care and decision making? A mixed method evaluation

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2018-028609
Article Type:	Research
Date Submitted by the Author:	19-Dec-2018
Complete List of Authors:	van Huizen, Lidia; University of Groningen, University Medical Center Groningen, Quality and Patient Safety; Oral and Maxillofacial Surgery Dijkstra, Pieter; University of Groningen, University Medical Center Groningen, Centre for Rehabilitation Halmos, Gyorgy; University of Groningen, University Medical Center Groningen, Ear, Nose and Throat van den Hoek, Johanna; University of Groningen, University Medical Center Groningen, Radiotherapy van der Laan, Klaas; Medical Center Leeuwarden, Ear, Nose and Throat Wijers, Oda; Radiotherapeutic Institute Friesland Ahaus, Kees; University of Groningen, Faculty of Economics and Business, Operations; University of Groningen, Faculty of Economics and Business, de Visscher, Jan; Medical Center Leeuwarden, Oral and Maxillofacial Surgery; Free University Medical Center, Oral and Maxillofacial Surgery / Oral Pathology Roodenburg, Jan; University of Groningen, University Medical Center Groningen, Oral and Maxillofacial Surgery
Keywords:	Videoconferencing, Collaborating teams, Mixed method study, Added value, Multidisciplinary treatment, Head & neck tumours < ONCOLOGY

SCHOLARONE™
Manuscripts

1
2
3 1 **Does multidisciplinary videoconferencing between a head and neck cancer centre and its**
4 **partner hospital add value to their patient care and decision making? A mixed method**
5 **evaluation**
6
7
8

9 4 Lidia S. van Huizen (LvH), MSc^{1,2}, corresponding author, l.s.van.huizen@umcg.nl,

10 5 +31 50 361 8035

11 6 Pieter U. Dijkstra (PD), PT, PhD^{1,3}, p.u.dijkstra@umcg.nl

12 7 Gyorgy B. Halmos (GH), MD, PhD⁴, g.b.halmos@umcg.nl

13 8 Johanna G.M. van den Hoek (JvdH), MD⁵, j.g.m.van.den.hoek@umcg.nl

14 9 Klaas T. van der Laan (KvdL), MD, PhD⁶, kens.vdlaan@planet.nl

15 10 Oda B. Wijers (OW), MD, PhD⁷, o.b.wijers@skf-rif.nl

16 11 Kees (C.)T. B. Ahaus (KA), PhD⁸, c.t.b.ahaus@rug.nl

17 12 Jan G.A.M. de Visscher (JdV), DMD, MD, PhD^{9, 10}, j.de.visscher@znb.nl

18 13 Jan L.N. Roodenburg (JR), DDS, MD, PhD¹, j.l.n.roodenburg@umcg.nl

19 14 ¹ University of Groningen, University Medical Center Groningen, Department of Oral and
20 Maxillofacial Surgery, Groningen, The Netherlands

21 15 ² University of Groningen, University Medical Center Groningen, Department of Quality and
22 Patient Safety, Groningen, The Netherlands

23 16 ³ University of Groningen, University Medical Center Groningen, Centre for Rehabilitation,
24 Groningen, The Netherlands

25 17 ⁴ University of Groningen, University Medical Center Groningen, Department of Ear, Nose &
26 Throat / Head and Neck Surgery, Groningen, The Netherlands

27 18 ⁵ University of Groningen, University Medical Center Groningen, Department of Radiotherapy,
28 Groningen, The Netherlands

29 19 ⁶ Medical Centre Leeuwarden, Department of Ear, Nose & Throat, Leeuwarden, The Netherlands

30 20 ⁷ Radiotherapeutic Institute Friesland, Leeuwarden, the Netherlands

31 21 ⁸ University of Groningen, Faculty of Economics and Business, Centre of Expertise Healthwise,
32 University Medical Center Groningen, Groningen, The Netherlands

1
2
3 28 ⁹ Medical Centre Leeuwarden, Department of Oral and Maxillofacial Surgery, Leeuwarden, The
4
5 29 Netherlands

6
7 30 ¹⁰ Free University Medical Center, Department of Oral and Maxillofacial Surgery / Oral
8
9 31 Pathology, Amsterdam, The Netherlands

32 **ABSTRACT (wordcount 300)**

33 **Objectives**

34 Given the difficulties in diagnosing and treating head and neck cancer, care is centralized in the
35 Netherlands in eight head and neck cancer centres and six satellite regional hospitals as preferred
36 partners. A requirement is that all patients cases of the partners should be discussed with the head and
37 neck centre as part of the ‘collaborating contract’. In this mixed method study, we evaluate the added
38 value of videoconferencing regarding recommendations given and benefits for patients and teams.

39 **Design**

40 For one centre and its partner recommendations exchanged between their multidisciplinary team were
41 registered over six months. Semi-structured interviews were held with six medical specialists, three
42 from the centre and three from the partner, to explore the perceived benefits and drawbacks of
43 multidisciplinary videoconferencing.

44 **Results**

45 In total 336 patient cases were presented. In 8 cases (2%), specialists offered recommendations to the
46 collaborating team (3 given from centre to partner and 5 from partner to centre), that mainly consisted
47 of alternative diagnostic modalities or treatment plans for a specific patient. The interviews on the
48 videoconferencing revealed that medical specialists perceive added value in discussing complex cases
49 because the other team offers a fresh perspective by hearing the case ‘as new’. The teams recognize
50 the importance of keeping their medical viewpoints aligned, but the requirement (the partner should
51 discuss all patients with the centre) was seen as out-dated and lacking added value.

52 **Conclusions**

53 The added value of the videoconferencing is small considering patient care, but the specialists
54 recognize that it is important that their medical viewpoints are aligned and that their patients benefit

1
2
3 55 from the discussions about complex cases. Both, centre and partner felt the videoconferencing meeting
4
5 56 could be more efficiently organized.

6
7 57 We suggest to teams who want to implement videoconferencing as supportive medium: meet face-to-
8
9 58 face and make agreements before you start.

11 59 **Keywords**

12
13 60 Videoconferencing (MeSH term), head and neck cancer, collaborating teams, multidisciplinary
14
15 61 treatment, added value, mixed method study

17 62 **Strengths and limitations of this study**

- 20 63 • Videoconferencing facilitates multidisciplinary meetings between collaborating teams from
21
22 64 different locations to discuss complex cases that will benefit the quality of patient care and the
23
24 65 treating teams in keeping their medical viewpoints aligned (strength)
- 25
26 66 • The videoconferencing process could be more efficient if clear-cut cases that fully fit the
27
28 67 national multidisciplinary guidelines on diagnostic and treatment plans did not have to be
29
30 68 discussed between the centre and the partner (strength)
- 31
32 69 • Participating specialists from different specialisms and locations were interviewed and
33
34 70 identified benefits and drawbacks of the videoconference meetings (strength)
- 35
36 71 • Only one of the six centres and its preferred partner in the Netherlands was studied in depth
37
38 72 (limitation)
- 39
40 73 • The researcher's presence may have influenced the 'recommendation culture' (limitation)

41
42
43 74 **Wordcount 3997, without tables**

44 75 **INTRODUCTION**

45
46 76 Most tumours in the head or neck region (nasal cavity, paranasal sinuses, lips, mouth, salivary glands,
47
48 77 throat or larynx and complex skin malignancies) are fast growing tumours. This implies that a long
49
50 78 interval between the moment of referral and the start of the primary treatment (surgery, radiotherapy
51
52 79 and/or chemotherapy) can lead to tumour progression with less survival chance¹. Because of the
53
54 80 complexity of the diagnostic procedures and therapeutic modalities and the low volume of patients,
55
56 81 head and neck cancer care is centralized in multidisciplinary head and neck cancer centres (high
57
58 82 complex low volume cases)². In 1984, the Dutch Head and Neck Society (DHNS) was founded as a

1
2
3 83 scientific organization. Later the DHNS became involved in the nationwide organization of head and
4
5 84 neck cancer care. As a result, since 1993, head and neck cancer patients in the Netherlands are treated
6
7 85 in eight head and neck cancer centres recognized by the DHNS, of which six have preferred partners³.
8
9 86 Within each head and neck cancer centre, multidisciplinary meetings according to national evidence-
10
11 87 based guidelines are mandatory to provide the best diagnostic work up and treatment for patients, and
12
13 88 to sustain the quality of care in the oncology centres⁴⁻⁷.

15 89 In 1997, after a pilot of 4 years, the Medical Centre Leeuwarden became the preferred partner
16
17 90 of the Head and Neck Cancer Centre of the University Medical Centre Groningen⁸, further referred to
18
19 91 as the “partner” and the “centre”. The collaboration of a centre with its partner is based upon trust and
20
21 92 sustainable agreements⁹⁻¹¹. The backbone of the collaboration is the weekly multidisciplinary meeting
22
23 93 between centre and partner to discuss and verify diagnostic and therapeutic plans. The efficiency of
24
25 94 the multidisciplinary meetings is important for decision making and care pathway management¹².

28 95 The DHNS and the Dutch Health Care Inspectorate (DHCI) require that all new patients of the
29
30 96 partner, including those with relatively common head and neck tumours, be discussed in a weekly
31
32 97 multidisciplinary meeting with the centre². This requirement can be seen as a form of quality control
33
34 98 over the partner clinic (further referred to as ‘the DHCI requirement’). Specialists from both locations,
35
36 99 centre and partner, from the departments of oral and maxillofacial surgery (OMS), ear, nose and throat
37
38 100 (ENT) and radiotherapy (RT) participate. This weekly multidisciplinary meeting is additional to a
39
40 101 local multidisciplinary patient meeting held at the hospital where the patient is first seen and will be
41
42 102 treated. Initially, these collaborative multidisciplinary weekly meetings were held in the centre but,
43
44 103 when videoconferencing became available, this medium became the method of choice for this
45
46 104 communication^{13, 14}. The weekly videoconference is scheduled after the local multidisciplinary
47
48 105 meetings. During the videoconferencing, the partner presents all patient cases, including available
49
50 106 imaging, and proposed diagnostic and therapeutic plan. The centre presents a selection of its cases,
51
52 107 those it considers complex or interesting to discuss. Both sides are free to offer recommendations. The
53
54 108 team that presents the patient case is responsible for documenting changes when a recommendation is
55
56 109 implemented. Recommendations from both teams to the decision-making regarding diagnostic and
57
58 110 therapeutic plans may add value to the quality of patient care¹⁵.

111 **Research Question**

112 Our overall question was whether the multidisciplinary videoconferencing between a head and neck
113 centre and its partner adds value to the treatment of head and neck cancer patients in the care
114 pathways. This resulted in two sub questions.

115 1. In what percentage of cases recommendations are given on diagnostic and/or therapeutic plans
116 being given by the teams during the videoconference?

117 2. What benefits and drawbacks of the videoconference are perceived by the specialists in the
118 teams?

119 **DESIGN**

120 In this mixed method study, we evaluate the added value of this multidisciplinary videoconferencing
121 for head and neck cancer care or pathway management. The mixed method approach¹⁶⁻¹⁸ had
122 quantitative and qualitative elements. The primary outcome of the weekly multidisciplinary
123 videoconferencing, 'added value', was first operationalized as the percentage of cases in which
124 recommendations on diagnostic and treatment plans were given. A second component of 'added value'
125 was operationalized as the benefits or drawbacks experienced by the participants of the
126 multidisciplinary videoconferencing. In the study period, the teams acted conform the DHCI
127 requirement that all patients of the partner should be presented in a multidisciplinary meeting with the
128 centre.

129 **Patient data**

130 Data of all patients presented by one of the teams during the weekly multidisciplinary
131 videoconferences between September 2016 and February 2017 were included. The tumour
132 localization, histology and tumour stage were registered for all patients that were presented.

133 **Recommendation registration**

134 Recommendations made during the videoconference were registered with the relevant data from
135 electronic and written medical records on a clinical registration form by LvH during the
136 videoconference. Each recommendation was assessed by the two teams with respect to change impact
137 (minor or major, Table 1a) on the diagnostic and/or therapeutic plan, case complexity, use of national
138 multidisciplinary guidelines for diagnostic or treatment plans, and comorbidity of the patient (Table

139 1b)^{19,20}. LvH registered the given recommendation with the relevant data; JdV and JR verified the
 140 registrations. During the videoconferencing sessions, field notes were taken by LvH.

141 **Table 1.** Definitions of change impact and case complexity

142 **Table 1a** Operational definitions of major and minor changes in diagnostic or treatment plan

	diagnostic plan	treatment plan	remarks
minor	additional more-detailed MRI or CT-Thorax of the area already imaged	logistic change	
major	additional MRI or CT-thorax in a different area from the area already imaged	change in modality: adding or deleting a therapeutic modality; surgery radiotherapy or chemotherapy	
criterion	addition of diagnostic plan in a different area than already investigated	adding or deleting a treatment modality from the treatment plan in the proposed or in a different area	after the major/minor decision is made, the decision registered in the CRF will be verified by both specialists (giver and receiver).

143
 144 **Table 1b** Operational definition of case complexity

	modality	guideline	comorbidity
not complex	unimodal treatment	diagnosis and treatment follows guideline	no comorbidity
complex	multimodal treatment	diagnosis and/or treatment does not follow guideline	comorbidity
remark	- unimodal: surgical procedure chemotherapy primary radiotherapy - multimodal: reconstruction surgery chemo- or bioRT	which guidelines are followed	

145
 146 **Patient involvement in study design**

147 Patients were not involved in the study design because the main purpose of the study was to evaluate
 148 the added value of the DHCI requirement to discuss all patients of the partner with the centre in a
 149 weekly videoconference.

150 **Qualitative Analysis**

151 Semi-structured interviews were conducted with six medical specialists, one from the OMS-, ENT-
 152 and RT-department of the centre and the partner, to explore the added value of the weekly

1
2
3 153 videoconference. The field notes taken by the researcher during the weekly videoconference sessions
4
5 154 were used to develop the questions for the semi-structured interviews. After receiving verbal informed
6
7 155 consent from the specialists, the semi-structured interviews started with providing information about
8
9 156 the recommendations given. Thereafter it continued with the open question ‘What do you think is the
10
11 157 value of the videoconference between the head and neck cancer centre and their preferred partner?’.
12
13 158 LvH then guided the interview using a short topic list including ‘added value’ and ‘perceived
14
15 159 possibilities for change or improvement in the videoconferencing process’ (Textbox 1). The different
16
17 160 topics were introduced in a flexible way, and the interviews took the form of natural conversations.
18
19

20 161 **Textbox 1 Interview Guide**

Topics	Questions
Added value videoconferencing	What do you think is the added value of the videoconference between the head and neck cancer centre (centre) and their preferred partner (partner)? Could you mention strong points of the videoconferencing? Could you give examples? Could you name points for improvement? Could you mention examples?
Role of specialism in videoconference	What do you think the role of a specialist is in the videoconferencing between centre and partner? The consultation is required by the Dutch Head and Neck Working Group and the Dutch Health Inspectorate, how usefulness do you think it is? Would you advise stopping the consultation if it was not mandatory?
Results interpretation	Have you given recommendations to the centre/partner? Have you received recommendations from the centre/partner? Could you indicate what the difference is between peer consultation and giving a recommendation? What do you think would be an ideal videoconference? Could you explain your answer? What do you think could be adjusted in the videoconference to make the consultation more effective and more efficient?

21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42 162
43
44 163 Interviews took 25 to 40 minutes, were audio recorded and transcripts of the interviews were
45
46 164 made. The participants were asked to review the transcript report and extracted quotes. These quotes
47
48 165 related to perceived added value, possible improvements and the role of a specialist in the
49
50 166 multidisciplinary videoconference. Following this, quotes were coded for their relevance to possible
51
52 167 benefits or drawbacks for the collaboration between the teams and for patient care. The first stage of
53
54 168 this inductive analysis of the interviews involved two authors, JR and JdV, in an initial open coding
55
56 169 procedure that resulted in a list of codes corresponding closely to the text fragments extracted from the
57
58 170 six interviews. The codes were placed in a coding tree in relation to the research question²¹. Any
59
60

1
2
3 171 disagreements during the coding were discussed between the coders and the researcher²². After the
4
5 172 preliminary results were collated, a member check was performed to check credibility of results with
6
7 173 participants ²³.
8

9 174 **Sample size calculation**

10
11 175 In a pilot study for the quantitative part of the study, it was found that approximately 20% of the cases
12
13 176 presented at the videoconference led to a recommendation. To estimate this percentage to a 10%
14
15 177 precision (95 % confidence interval: 15.5 % to 25.4 %) would require a total of 250 cases. On average,
16
17 178 15 cases were discussed at each weekly videoconference meeting and, on this basis, we calculated that
18
19 179 six months would be sufficient to acquire the necessary 250 cases.

20
21
22 180 The pilot study was also used to define and operationalize the different options for measurements to
23
24 181 answer the quantitative research question.

25 182 **Videoconferencing equipment used**

26
27
28 183 Videoconferencing takes place in dedicated multidisciplinary meeting rooms, where two screens can
29
30 184 be operated with two to four computers with monitors. The videoconferencing is operated via
31
32 185 application 'Webex' and a camera, one of the locations calls the other. While the patient data is
33
34 186 presented on the first screen, teams can see each other on the second screen. Data is sent via optical
35
36 187 fiber.
37

38 188 **Statistical analysis**

39
40
41 189 Our primary outcome measure was the percentage of cases presented that led to recommendations by
42
43 190 the team of the centre to the partner or vice versa. The t-test for independent samples and the Chi-
44
45 191 Square test (exact procedure case requirements for the Chi-Square test were not met) was used to
46
47 192 analyse differences in age, gender, tumour localization and tumour histology (ICD(O))²⁴, and tumour
48
49 193 stage between cases presented by the centre and those presented by the partner. Statistical analyses
50
51 194 were performed using SPSS 23.0 for Windows software. In all analyses, statistical significance was set
52
53 195 at the 5% level.
54

55 196 **RESULTS**

56 197 **Quantitative analysis**

57
58
59
60

1
2
3 198 From September 2016 to February 2017, 82 patients were presented by the centre and 177 by the
4
5 199 partner in 18 weekly videoconferencing meetings (Table 2). In this period of 22 weeks, three meetings
6
7 200 were cancelled due to a ‘medical complication meeting’, a technical problem to connect and a holiday
8
9 201 recess; on one occasion the researcher could not attend the meeting.
10

11 202
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

203 **Table 2** Patients and their tumour characteristics, as presented during videoconference meetings

Number of patients (total n = 259) (n= number of available data)	centre (n = 82)		partner (n = 177)		statistics, p =
	mean	sd	mean	sd	
Age (Mean, sd)	67.8	15.2	66.7	16.1	(t-test) .533
Gender (n = 259)	n	%	n	%	(Chi ²) .394
Female	27	10	68	26	
Tumour localization (n = 206*)	n	%	n	%	(Chi ² -exact) < .001
Lip (C00)	3	3	4	2	
Oral cavity	21	23	29	12	
Tongue (C01, C02)	6	-	11	-	
Gums (C03)	5	-	7	-	
Floor of mouth (C04)	4	-	4	-	
Oral cavity, unspecified (C05, C06, C14)	6	-	7	-	
Major salivary glands (C07, C08)	2	2	7	3	
Oropharynx (C09,C10)	7	8	6	2	
Nasopharynx (C11)	0	0	0	0	
Nasal Cavity (C30)	2	2	3	1	
Hypopharynx (C12, C13)	5	5	5	2	
Sinus (C31)	3	3	3	1	
Larynx (C32)	10	11	15	6	
Bronchus and Lung (C34)	0	0	5	2	
Hematologic and reticuloendothelial systems (C42)	0	0	11	5	
Skin (C44)	14	15	35	14	
Lymph nodes (C77)	2	2	1	0	
Unknown (C80)	3	3	0	0	
Miscellaneous (C20, 33, 41, 49, 50, 64, 73)	3	3	7	3	
Unknown (C80)	3	3	0	0	
Morphology or cell type (n = 259)	n	%	n	%	(Chi ²) < .001
Squamous cell carcinoma (SCC)	57	72	78	44	
Basic cell carcinoma (BCC)	3	4	6	3	
Melanoma	0	0	11	6	
Miscellaneous malignant	7	9	9	5	
Benign	2	2	18	10	
Infection – premalignant abnormalities	2	2	12	7	
Miscellaneous	11	13	43	24	
T-stage (n= 159**)	n	%	n	%	(Chi ²) < .001
T1	13	14	42	17	
T2	20	22	20	8	
T3	8	9	9	4	
T4	25	27	14	6	
Tx	7	8	1	1	

*= only tumour localization if tumour diagnosed; **= only TNM-code if firstly diagnosed, so there are more patients in which 'localization' is known (i.e. for relapse or tumour residue or metastases).93

In total 336 cases presented: 93 by centre and 243 by partner.

204

1
2
3 205 Most of the centre's patients (71 out of 82 – 86%) were presented only once, 9 were presented
4
5 206 twice (11 %), one patient was discussed three times and another four times. Whereas 111 patients were
6
7 207 presented only once (63%) by the partner. In general patients of the partner where presented twice or
8
9 208 three times: the first time their diagnostic plan, the second time the therapeutic plan and sometimes
10
11 209 surgical results the third time (55 out of 177 – 31%). Only one patient was discussed four times; five
12
13 210 patients on the partner's list were not discussed at the first opportunity because imaging was not
14
15 211 complete.

16
17 212 There were significant differences ($p < .001$) in the cases presented by the centre and the partner
18
19 213 regarding tumour localization, histology and tumour stage (Table 2): the partner presented more cases
20
21 214 with infections that were initially suspected malignancy, T1-stage patients or non-complex cases. Not
22
23 215 all specialisms were present during all the videoconference meetings. In 61% of the 18
24
25 216 videoconferences both teams were complete; the centre team was not complete in 22% ($n=4$) and, in
26
27 217 17% ($n=3$), the partner team was not complete. The centre's ENT department was represented in most
28
29 218 meetings by a fellow training to be a head and neck surgeon. The centre presented on average 5.2 (SD
30
31 219 2.4) cases per videoconference, the partner presented on average 13.5 (SD 3.9) cases.

32 220 **Recommendations given**

33
34
35 221 Recommendations were given in 8 of the 336 cases presented (2%; 95% confidence interval: 1 to 5%)
36
37 222 relating to 8 of the 259 patients (3%; 95% confidence interval: 1 to 6%). In the pilot study we found
38
39 223 that 'some kind of advice' was given in 20% of the cases.

40
41 224 Of these recommendations, five were major and three minor (Table 3). Four recommendations
42
43 225 concerned diagnostic plans, and four treatment plans. On three of the eight occasions when a
44
45 226 recommendation was given, the centre's team was incomplete with one of the three specialisms
46
47 227 absent. Seven of the eight recommendations were given by OMS specialists, and five of the eight were
48
49 228 related to ENT patients. Seven of the eight instances occurred on a patient's first presentation, and the
50
51 229 other one during a second presentation although, in this case, the imaging had not been complete the
52
53 230 first time. In general, recommendations were given related to the more complex cases, but not
54
55 231 necessarily patients with comorbidity or those with more advanced tumours.

232 **Table 3** Recommendation and its specifics

No	Recommendation	Who	To whom	Team complete?	Recommendation (short)	Change impact, diagnosis or treatment phase	Patient status (ICD-code, TNM-classification, histology; case complexity, guideline used and comorbidity)					
							ICD	TNM	histology	complex?	guideline?	comorbid?
1	2016G10-1 28-09-2016	OMS partner	ENT centre	yes	give patient choice of expectative policy	major, treatment	C44	T2N0M0	SCC	yes	no	yes
2	2016L14-1 28-09-2016	OMS centre	OMS partner	yes	ultrasound guided biopsy	minor, diagnosis	-	-	maligne lymphoma	no	yes	no
3	2016G32-1 26-10-2016	OMS partner	OMS centre	centre not	use methotrexate to identify malignancy	minor, treatment	C00	T1N0M0	SCC	yes	yes	no
4	2016G39-1 23-11-2016	OMS partner	ENT centre	yes	change surgery approach to retain functionality	major, treatment	C00	T2N0M0	adenoid cystic carcinoma	yes	no	no
5	2016G40-1 23-11-2016	OMS partner	ENT centre	yes	try PDT	major, treatment	C01	T4aN0M0	SCC	yes	no	no
6	2016G51-1 14-12-2016	OMS partner	ENT centre	centre not	consult Ophthalmology	major, diagnosis	C44	T2N0M0	BCC eye corner	yes	no	yes
7	2016L90-2 14-12-2016	OMS centre	ENT partner	centre not	new biopsy	major, diagnosis	C31	T3NxM0	Melan.	yes	yes	yes
8	2017L123-1 04-01-2017	RT centre	OMS partner	yes	add MRI	minor, diagnosis	C07	T1N0M0	SCC	yes	yes	no

Squamous cell carcinoma (SCC), BCC = Basal cell carcinoma, Melan. = Melanoma; MRI = Magnetic Resonance Imaging; PDT = Photo Dynamic Therapy

233

1
2
3 234 **Qualitative analysis – specialist interviews**
4

5 235 From the transcripts of the six interviews, 107 quotes were registered. During the coding procedure,
6
7 236 items were placed in a coding tree with relevance to the primary research question (recommendations
8
9 237 given) and the secondary research question (added value as described in terms of perceived benefits
10
11 238 and drawbacks) by the researcher in consultation with the coders. For each major theme, minor themes
12
13 239 were derived from the researcher's field notes. In total 282 scores were given (Table 4). In several
14
15 240 instances the quotes were scored differently although the inter-coder agreement was acceptable given
16
17 241 the possible 37 codes to choose from.

18
19
20 242 Codes were judged as being a benefit or a drawback. Benefits were more frequently mentioned
21
22 243 by specialists of the partner, and the drawbacks more frequently by specialists of the centre. But the
23
24 244 majority of given codes by the coders (of the centre and of the partner) had a positive connotation for
25
26 245 the videoconferencing (Table 4).
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

246 **Table 4** Coding tree evaluation videoconferencing

Coding tree			Pos?	Code	Code description	Part-ner	Centre	Total	
Videoconferencing	Recom-menda-tion	Nuance	+	22	videoconferencing is mostly 'inter-collegial consultation'	3	3	6	
			+	14	recommendations are nuances, not a totally different medical policy or diagnostic/treatment plan for a specific patient	7	10	17	
		Follow-up traceable?	+	6	suggestions are taken from others	1	2	3	
			+	20	there is no patient-level evaluation on the implementation of medical policies agreed, question of trust	3	2	5	
			-	34	sometimes decisions are already taken in relation to continuity of treatment	1	1	2	
		Aligning	+	1	fine-tuning or aligning medical policies	10	10	20	
			+	9	continue routine cases discussion to prevent deviation from medical policies	2	2	4	
		Knowledge	0	32	besides videoconferencing also bilateral consultation via telephone	4	1	5	
			+	37	keep 'know how' with routine cases	1	2	3	
		Added Value?	Videoconfe-rence session	+	8	added value for complex cases vs. routine cases	21	24	45
	-			15	little added value	8	1	9	
	0			27	discuss radio-therapeutic scheme	2	2	4	
	-			29	non-complex cases or 'formalities' are communicated because it is mandatory, no added value	7	1	8	
	+			30	recommendation given to own discipline	5	1	6	
	Team completeness		+	4	presence of all three disciplines is essential	3	4	7	
			+	11	expertise (good) of physician is important	5	3	8	
			0	23	add presence of medical oncology discipline as expertise	2	2	4	
	Collabo-ration		Communi-cation	0	2	working together requires communication	8	2	10
				+	10	at both locations working methods are comparable through videoconferencing	5	2	7
		-		19	initially it was good to consult, added value decreased because teams have grown towards each other	1	1	2	
		Trust	+	5	respectful collaboration	3	7	10	
+			7	mutual trust	4	5	9		
+			13	important to know the partner, not only via videoconferencing; good for cohesion	8	7	15		
Expertise		-	18	centre member does not think videoconferencing necessary, because partner should be trusted as such	2	4	6		
		+	26	expertise and new developments from centre to partner	2	2	4		
DHCI		0	21	videoconferencing between centre and partner is a national agreement or policy	2	3	5		

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

Coding tree		Pos?	Code	Code description	Part-ner	Centre	Total
	requirement	-	31	the national policy – to discuss all cases including routine cases – between centre and partner is perceived as out-dated	7	2	9
Plan-ning	Logistics	-	16	stressful, considering other videoconferences	3	6	9
		0	17	integrate videoconferencing in the hospital’s videoconference for centre and partner	5	7	12
	Preparation	-	12	improve format of patient presentation	1	1	2
		+	24	good preparation is important	5	4	9
	Commitments	+	25	starting and stopping the videoconferencing on time is important	4	1	5
		-	33	possibly cancel videoconferencing when nothing to discuss	1	1	2
	Equipment	+	3	technique always flawless	1	1	2
		-	35	sometimes videoconferencing did not take place due to technical malfunction	1	1	2
-		36	placement of monitor in the room hinders colleagues and hampers interaction	2	2	4	
Scientific Research		0	28	bias through research setting because researcher as observer is present (Hawthorne effect)	1	1	2
Total quotes					151	131	282

This coding tree has major and minor themes that were derived from the primary research question (recommendations given), the secondary research question (added value as described in benefits and drawbacks perceived) and minor themes derived from researcher’s field notes. One code was related to the research situation.

‘Pos?’ refers to the question: has this code a positive connotation or benefit? + = yes, 185 scores; 0 = neither positive nor negative, 42 scores; - = no, 55 scores.

The amount of codes given is given for the partner, the centre and in total. DHCI is short for Dutch Health Care Inspectorate.

247

1
2
3 248 Six main items were important in the view of the specialists that were interviewed, each illustrated
4
5 249 with one or two quotes in italic.

6
7 250 1. The videoconference adds value when discussing complex cases, through assisting in fine
8
9 251 tuning and aligning medical procedures (code 1, 20x);

10
11 252 *A patient is presented about which the own team had some discussion, that can be discussed with the*
12
13 253 *partner. In that manner you get a confirmation or advice to change your policy. This advice can be*
14
15 254 *given by the same specialism, but also by other members of the Head and Neck Oncology team (ENT).*

16
17 255 2. Communication is essential for cooperation between the teams (code 2, 10x), furthermore it is
18
19 256 important to know the partner well, not only via videoconferencing (code 13, 15x) and to
20
21 257 interact respectfully (code 5, 10x) with mutual trust (code 7, 9x).

22
23 258 *The most important feature of the videoconferencing is to communicate with each other on substantive*
24
25 259 *medical matters, to be on speaking terms, and to know each other (RT).*

26
27 260 *During the videoconferencing we respect each other, we listen to each other and we are open to each*
28
29 261 *other's additional comments. We trust each other as partners (OMS).*

30
31 262 3. Recommendations are suggested alternatives on diagnostic modalities and treatment plans for
32
33 263 specific patients (code 14, 17x).

34
35 264 *The videoconference has the character of a collegial discussion, in which in collaboration the best*
36
37 265 *diagnostic or treatment plan for your patient is reached. Confirmation on your policy adds value too*
38
39 266 *(OMS).*

40
41 267 4. For non-complex cases that fall within guideline for treatment, the videoconference meeting
42
43 268 adds little value as for changes in medical content, it can even irritate the participants in such
44
45 269 cases (code 15, 9x).

46
47 270 *The videoconference sometimes changes a policy for an individual patient. The videoconference is not*
48
49 271 *the meeting where new policies or guidelines are developed (RT).*

50
51 272 5. There is a wish to integrate the videoconference with the site multidisciplinary meeting in both
52
53 273 hospitals, the centre and the partner (code 17, 12x).

54
55 274 *Integration of the two local multidisciplinary meetings with the videoconference could be valuable*
56
57 275 *(ENT).*

1
2
3 276 6. The DHCI requirement (discuss all the partner's cases with the centre) is not felt to add value,
4
5 277 but rather seen as old-fashioned or out-dated (code 29, 8x).

7 278 *It is better to prepare at a high level and discuss, than to present all the patients and deal with each*
8
9 279 *one briefly. Mutual preparation on special request could have added value, for example a literature*
10
11 280 *search on a complex osteosarcoma case (OMS).*

13 281 **DISCUSSION**

15 282 Our results show that the added value of the weekly multidisciplinary videoconference between the
16
17 283 head and neck cancer centre and the preferred partner hospital was small given the few
18
19 284 recommendations made on the initial diagnostic and/or therapeutic treatment plan (in only 2% of the
20
21 285 336 cases presented). Nevertheless, the specialists from both sites recognized the importance of
22
23 286 keeping their medical viewpoints aligned through this type of communication. Whenever discussing
24
25 287 complex cases in which a major change was recommended (in 5 of the 8 recommendations), for
26
27 288 example to change the surgical approach to save functionality of organs or tissue, the recommended
28
29 289 change in treatment had a large impact for that patient (Table 3).

31
32 290 Contrary to our findings from the pilot study, where advice was offered in 20% of the presented
33
34 291 cases and on which the estimated sample size was based, the actual 2% recommendations is much
35
36 292 lower. Although it is difficult to explain this difference, we think that the pilot served mainly as a
37
38 293 feasibility check, that helped us to define our research questions and to operationalize the definitions.
39
40 294 Other factors may also have played a role in the difference of outcomes between the pilot and the
41
42 295 actual study. Firstly, the long-lasting cooperation between the centre and the partner had led to a high
43
44 296 level of alignment on diagnostic and therapeutic 'strategies' or medical viewpoints. Secondly, the
45
46 297 participants were not blinded for the research question. Thus awareness of being part of an experiment
47
48 298 may have led to a drive to perform well and to present the patients with an optimal diagnostic and
49
50 299 treatment plan, also called 'the Hawthorn effect'. Often the teams mentioned that the other team was
51
52 300 asked to give collegial advice and therefore a suggestion was not always seen as a recommendation.
53
54 301 Thirdly, some patient cases were only presented as interesting to discuss. Finally, during the pilot
55
56 302 study the advice given was not assessed for its impact.
57
58
59
60

1
2
3 303 In the qualitative part of this study the interviews on the benefits and drawbacks of
4
5 304 videoconferencing revealed that medical specialists perceive added value in discussing complex cases
6
7 305 in a collegiate consultation, because another team can offer a fresh perspective by hearing the case ‘as
8
9 306 new’. Although remarks were often about nuances, the confirmation on the chosen policy by the other
10
11 307 team was experienced as helpful. This view is supported in literature where medical specialists found
12
13 308 videoconferencing useful in at least one aspect of their practice⁹.

15 309 An important condition to communicate through videoconference is that participants should know
16
17 310 each other from meetings with physical attendance, to support mutual trust and respect as the basis for
18
19 311 the cooperation. Two studies support the finding in their conclusions, stating that collaboration and
20
21 312 cooperation improves when each discipline understands each other’s roles and that specialties working
22
23 313 together for a long time do not need many words to come to a decision^{15, 25}.

26 314 The videoconference meeting can be used to introduce and discuss new developments, protocols
27
28 315 and guidelines leading to comparable quality of care in both locations. Two studies found that a
29
30 316 comprehensive cancer centre team working together over videoconferencing with a peripheral hospital
31
32 317 team align their treatment plans: discussing radiotherapy treatment plans changes are major and minor,
33
34 318 7 % of cases and 21% respectively¹⁴ and speed up follow-up appointments¹³.

36 319 The weekly multidisciplinary videoconference meeting differs from the local multidisciplinary
37
38 320 meeting: during videoconferencing complex cases are discussed with a second ‘expert team’ of head
39
40 321 and neck oncology specialists. The patients treated by the centre and by the partner are comparable,
41
42 322 although diagnostics and treatment might differ slightly²⁶. In our study the significant differences in
43
44 323 terms of tumour localization, cell type and tumour stage seen in the presented cases are a consequence
45
46 324 of ‘the DHCI requirement’ (all patients treated by the ‘preferred partner’ should be discussed in a
47
48 325 multidisciplinary patient meeting with the centre), whereas the ‘centre’ could decide which of its
49
50 326 patients would make an interesting case for discussing with their partner. As a consequence, the
51
52 327 partner presents 3 to 4 times as many patients as the centre. One third of these (31%) reappear in the
53
54 328 subsequent videoconferences, checking: extra diagnostic information, the treatment plan and the need
55
56 329 for adjuvant therapy. Most of this is seen as a ‘formality (checking compliance to guidelines)’. The
57
58 330 data from the interviews suggest that especially complex patient cases would benefit from inter

1
2
3 331 collegial consultation via videoconferencing. If the teams were not obliged to discuss so many
4
5 332 straightforward cases, they could use the time saved to prepare and discuss complex cases in greater
6
7 333 depth (Results, finding 6, quote OMS)²⁷.
8

9 334 The perceived value of the videoconference might be influenced by the expertise of a specialist.
10
11 335 The recommendations given during the evaluation period were mostly given to ENT by an OMS
12
13 336 oncologist who had considerably more clinical experience than his opposing fellow, and was also one
14
15 337 of the instigators of the videoconference. It could be that with a marked difference in experience,
16
17 338 recommendations are given and accepted more easily¹¹. This way videoconferencing supports
18
19 339 specialists getting experience with presenting complex oncology patient cases and with decision
20
21 340 making in teams^{5, 15}.
22
23

24 341 In this study, we evaluated in depth the added value of a multidisciplinary videoconference
25
26 342 meeting between one oncology centre and its preferred partner. In line with other studies^{28, 29}, this
27
28 343 study shows that, in addition to a quantitative result (number of recommendations), it is important to
29
30 344 reflect on the situation through an interview process (qualitative results) before starting to implement
31
32 345 improvements. What our interviews showed is that the specialists at both the centre and the partner
33
34 346 support the idea of sustainable cooperation, but they do not support the view implicit in the DHCI
35
36 347 requirement that the centre should act as means of quality control for the partner³⁰. Our findings on
37
38 348 videoconferencing are supported by others in terms of the positive results on teams working together.
39
40 349 More studies have shown that more research is needed to understand the effects of videoconferencing
41
42 350 on patient outcomes such as finance including resource usage^{31, 32}, what fields of specialisms could
43
44 351 benefit from the medium²⁵, participant satisfaction³³, throughput times³⁴ and self-management for
45
46 352 patients³⁵.
47
48

49 353 In summary, based on our findings, we believe that the DHCI requirement (the partner should
50
51 354 discuss all patients with the centre) is unnecessary in the case of routine patients, since it does not add
52
53 355 value to the quality of their treatment. It is more useful to spend time on complex cases in greater
54
55 356 detail. We propose the following measures that will add value to the weekly videoconference:
56
57

- 58 357 1. All the participating medical specialists should be granted freedom to select only complex or
59
60 358 interesting cases that could serve to keep medical procedures aligned.

1
2
3 359 2. The partner should not be obliged to present cases seen as ‘formalities’ since this does not add
4
5 360 value.

6
7 361 3. The videoconference should be organized as an integral part of the partners’ multidisciplinary
8
9 362 meetings and not as a separate weekly meeting.

10
11 363 Based on our findings on the added value of the multidisciplinary videoconference between the
12
13 364 head and neck centre and its partner organization, and our suggestions for improvements in this
14
15 365 activity, we would advise the DHNS, along with healthcare policymakers, to reconsider making the
16
17 366 DHCI requirement.

18
19
20 367 In our study we found that there are clinical and practical implications on how and when to start
21
22 368 with videoconferencing instead of meetings with physical attendance. Videoconferencing must be seen
23
24 369 as a supportive medium for communication within a sustainable collaboration of parties that
25
26 370 understand each other’s roles and work with guidelines or protocols.

27
28 371 Participants of a videoconference should:

29
30 372 1. Know each other, and meet face-to-face on a regular basis.

31
32 373 2. Respect each other as ‘expert / knowing’ colleague and know each other’s role in the
33
34 374 multidisciplinary treatment of patients.

35
36 375 3. Trust each other in follow-up of changes to diagnostic and treatment plans.

37
38
39 376 In view of the above mentioned implications we would not recommend starting with
40
41 377 videoconferencing for multidisciplinary meetings if a majority of participants do not know each other.

42 43 378 **CONCLUSIONS**

44
45 379 The videoconferencing has added value in the cooperation and in the care pathways management.

46
47 380 Centre and partner align their medical policies when interpreting national multidisciplinary guidelines.

48
49 381 The videoconference meeting provides a means to discuss complex cases with another ‘expert team’
50
51 382 with a fresh perspective to reach an optimal decision regarding diagnostic and treatment plans.

52
53 383 Conversely, discussing non-complex cases is seen as an unnecessary burden, and the DHCI
54
55 384 requirement to discuss all the partner’s cases as out-dated.

56 57 385 **LIST OF ABBREVIATIONS**

1		
2		
3	CRF	Case Report Form
4		
5	DMD	Doctor of Dental Medicine
6		
7	DDS	Doctor of Dental Surgery
8		
9	DHNS	Dutch Head and Neck Society
10		
11	DHCI	Dutch Health Care Inspectorate
12		
13	ENT	Ear, Nose and Throat
14		
15	ICD(O)	International Classification of Diseases (of Oncology)
16		
17	MCL	Medical Centre Leeuwarden
18		
19	MeSH	Medical Subject Headings
20		
21	OMS	Oral and Maxillofacial Surgery
22		
23	RT	Radiotherapy
24		
25	SPSS	Statistical Package for Social Sciences
26		
27	UMCG	University Medical Center Groningen
28		
29		

30 386 **DECLARATIONS**

31 387 **Ethics approval and consent to participate**

32
33
34 388 This prospective observational study on decision-making analysis was checked by the Medical Ethics
35
36 389 Review Board of the UMCG (2016, ref. M16.194909), the Netherlands. They concluded that the study
37
38 is not a ‘clinical research study with human subjects’ as meant in the Medical Research Involving
39 390 Human Subject Act (WMO). Informed consent was not required. The Dutch law requires also a
40
41 391 privacy statement from the partner in the study, the Medical Centre Leeuwarden (2016, nWMO 187).
42
43 392

44 393 **Data sharing statement**

45
46 394 Datasets will be available from the corresponding author on request.
47

48 395 **Consent for publication**

49
50 396 Not applicable.
51

52 397 **Competing interests:** No authors have competing interests.
53

54 398 **Funding:** This research received no specific grant from any funding agency in the public, commercial
55
56 or not-for-profit sectors.
57 399

58 400 **Authors’ Contribution**

1
2
3 401 LvH was involved in the study design and concept; carried out the study; performed the statistical
4
5 402 analysis and the analysis and interpretation of the data; and drafted the manuscript. PD, KA, JdV and
6
7 403 JR, the supervisor, were involved in the study design and concept, analysis and interpretation of the
8
9 404 data, and revision of the manuscript. JdV and JR were involved in the coding of the interview
10
11 405 quotations, together with LvH. GH, JvdH, KvdL and OW were involved in the acquisition of the data
12
13 406 and the revision of the manuscript.

14
15
16 407 All authors read and approved the final manuscript.

17 408 **Acknowledgements**

18
19
20 409 This research was sponsored by the University Medical Centre Groningen.

21 410 **Authors' information**

22
23
24 411 The University Medical Center Groningen is developing patient centred care pathways for
25
26 412 diverse patient groups including laws and regulations for quality and patient safety. LvH, JR
27
28 413 are working in cooperation with KA of the Centre of Expertise Healthwise to research care
29
30 414 pathway implementation in the Comprehensive Cancer Center Groningen and to develop
31
32 415 quality and safety indicators, i.e. process indicators that predict performance of care pathways
33
34 416 and sustainable patient outcome.

35 417 **REFERENCES**

- 36
37
38 418 1 Ouwens M, Hermens R, Hulscher M, et al. Development of indicators for patient-centred cancer
39
40 419 care. *Support Care Cancer* 2010;18:121-30 doi:10.1007/s00520-009-0638-y; 10.1007/s00520-009-
41 420 0638-y.
- 42
43
44 421 2 Policy head and neck cancer care 2013 (in Dutch). Available at:
45 422 <http://www.nwhht.nl/organisatie/missie>.
- 46
47
48 423 3 Halmos GB, Bras L, Siesling S, et al. Age-specific incidence and treatment patterns of head and
49 424 neck cancer in the Netherlands-A cohort study. *Clin Otolaryngol* 2018;43:317-24
50 425 doi:10.1111/coa.12991 [doi].
- 51
52 426 4 Fleissig A, Jenkins V, Catt S, et al. Multidisciplinary teams in cancer care: are they effective in the
53 427 UK?. *Lancet Oncol* 2006;7:935-43 doi:S1470-2045(06)70940-8 [pii].
- 54
55 428 5 Ruhstaller T, Roe H, Thurlimann B, et al. The multidisciplinary meeting: An indispensable aid to
56 429 communication between different specialities. *Eur J Cancer* 2006;42:2459-62 doi:S0959-
57 430 8049(06)00555-7 [pii].
- 58
59
60

- 1
2
3 431 6 Ouwens MM, Hermens RR, Hulscher MM, et al. Impact of an integrated care program for patients
4 432 with head and neck cancer on the quality of care. *Head Neck* 2009;31:902-10 doi:10.1002/hed.21041;
5 433 10.1002/hed.21041.
6
7 434 7 Dutch National Cancer Control Programme. Progress Report on Cancer Control in the Netherlands,
8 435 2005-2010 (Dutch NCCP, Nationaal programma kankerbestrijding). 2010.
9
10 436 8 Cijfers over kanker / Figures on cancer. Available at: <http://www.cijfersoverkanker.nl>. Accessed
11 437 May, 6, 2017.
12
13
14 438 9 Norum J, Jordhoy MS. A university oncology department and a remote palliative care unit linked
15 439 together by email and videoconferencing. *J Telemed Telecare* 2006;12:92-6
16 440 doi:10.1258/135763306776084374 [doi].
17
18 441 10 Bydder S, Nowak A, Marion K, et al. The impact of case discussion at a multidisciplinary team
19 442 meeting on the treatment and survival of patients with inoperable non-small cell lung cancer. *Intern
20 443 Med J* 2009;39:838-41 doi:10.1111/j.1445-5994.2009.02019.x [doi].
21
22 444 11 Slavova-Azmanova NS, Johnson CE, Platell C, et al. Peer review of cancer multidisciplinary
23 445 teams: is it acceptable in Australia?. *Med J Aust* 2015;202:144-7 doi:10.5694/mja14.00768 [pii].
24
25 446 12 van Huizen LS, Dijkstra PU, van der Laan BFAM, et al. Multidisciplinary first-day consultation
26 447 accelerates diagnostic procedures and throughput times of patients in a head-and-neck cancer care
27 448 pathway, a mixed method study. *BMC Health Serv Res* 2018;18:820,018-3637-1 doi:10.1186/s12913-
28 449 018-3637-1 [doi].
29
30 450 13 Farris G, Sircar M, Bortinger J, et al. Extension for Community Healthcare Outcomes-Care
31 451 Transitions: Enhancing Geriatric Care Transitions Through a Multidisciplinary Videoconference. *J Am
32 452 Geriatr Soc* 2017;65:598-602 doi:10.1111/jgs.14690 [doi].
33
34 453 14 Seeber A, Mitterer M, Gunsilius E, et al. Feasibility of a multidisciplinary lung cancer
35 454 videoconference between a peripheral hospital and a comprehensive cancer centre. *Oncology
36 455* 2013;84:186-90 doi:10.1159/000345314 [doi].
37
38 456 15 Gagliardi A, Smith A, Goel V, et al. Feasibility study of multidisciplinary oncology rounds by
39 457 videoconference for surgeons in remote locales. *BMC Med Inform Decis Mak* 2003;3:7,6947-3-7.
40 458 Epub 2003 Jun 19 doi:10.1186/1472-6947-3-7 [doi].
41
42 459 16 Charmaz K. *Constructing Grounded Theory. A Practical Guide through Qualitative Analysis.*
43 460 London: Sage Publications 2006.
44
45 461 17 Plochg T, Juttman RE, Klazinga NS, et al. *Handbook health research (Handboek
46 462 gezondheidszorgonderzoek).* Houten: Bohn Stafleu van Loghum 2007.
47
48 463 18 O'Brien BC, Harris IB, Beckman TJ, et al. Standards for reporting qualitative research: a synthesis
49 464 of recommendations. *Acad Med* 2014;89:1245-51 doi:10.1097/ACM.0000000000000388 [doi].
50
51 465 19 Kallogjeri D, Piccirillo JF, Spitznagel EL, Jr, et al. Comparison of Scoring Methods for ACE-27:
52 466 Simpler Is Better. *J Geriatr Oncol* 2012;3:238-45 doi:10.1016/j.jgo.2012.01.006 [doi].
53
54 467 20 Paleri V, Wight RG, Silver CE, et al. Comorbidity in head and neck cancer: a critical appraisal and
55 468 recommendations for practice. *Oral Oncol* 2010;46:712-9 doi:10.1016/j.oraloncology.2010.07.008
56 469 [doi].
57
58
59
60

- 1
2
3 470 21 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a
4 471 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349-57
5 472 doi:mzm042 [pii].
6
7 473 22 Gioia DA, Gorley KG, Hamilton AL. Seeking Quality Rigor in Inductive Research: Notes on the
8 474 Gioia Methodology. *Organizational Research Methods* 2012;16:15,16-31
9 475 doi:10.1177/1094428112452151.
10
11 476 23 Birt L, Scott S, Cavers D, et al. Member Checking: A Tool to Enhance Trustworthiness or Merely a
12 477 Nod to Validation?. *Qual Health Res* 2016 doi:1049732316654870 [pii].
13
14
15 478 24 Vlaams Kankerregistratienetwerk. International Classification of Diseases for Oncology, third
16 479 edition, updates (in Dutch): Vlaams Kankerregistratienetwerk 2011:240.
17
18 480 25 Stevens G, Loh J, Kolbe J, et al. Comparison of recommendations for radiotherapy from two
19 481 contemporaneous thoracic multidisciplinary meeting formats: co-located and video conference. *Intern*
20 482 *Med J* 2012;42:1213-8 doi:10.1111/j.1445-5994.2012.02817.x [doi].
21
22
23 483 26 de Ridder M, Balm AJM, Baatenburg de Jong RJ, et al. Variation in head and neck cancer care in
24 484 the Netherlands: A retrospective cohort evaluation of incidence, treatment and outcome. *Eur J Surg*
25 485 *Oncol* 2017;43:1494-502 doi:S0748-7983(17)30364-5 [pii].
26
27 486 27 Xylinas E, Roupret M, Kluth L, et al. Collaborative research networks as a platform for virtual
28 487 multidisciplinary, international approach to managing difficult clinical cases: an example from the
29 488 Upper Tract Urothelial Carcinoma Collaboration. *Eur Urol* 2012;62:943-5
30 489 doi:10.1016/j.eururo.2012.08.022 [doi].
31
32
33 490 28 Helck A, Matzko M, Trumm CG, et al. Interdisciplinary expert consultation via a teleradiology
34 491 platform--influence on therapeutic decision-making and patient referral rates to an academic tertiary
35 492 care center. *Rofo* 2009;181:1180-4 doi:10.1055/s-0028-1109733 [doi].
36
37 493 29 Ottevanger N, Hilbink M, Weenk M, et al. Oncologic multidisciplinary team meetings: evaluation
38 494 of quality criteria. *J Eval Clin Pract* 2013;19:1035-43 doi:10.1111/jep.12022 [doi].
39
40 495 30 Stoffels AR. Cooperation among medical specialists: pain or gain? 2008.
41
42 496 31 Sezeur A, Degramont A, Touboul E, et al. Teleconsultation before chemotherapy for recently
43 497 operated on patients. *Am J Surg* 2001;182:49-51 doi:S0002-9610(01)00662-6 [pii].
44
45 498 32 Kunkler IH, Fielding RG, Brebner J, et al. A comprehensive approach for evaluating telemedicine-
46 499 delivered multidisciplinary breast cancer meetings in southern Scotland. *J Telemed Telecare* 2005;11
47 500 Suppl 1:71-3 doi:10.1258/1357633054461804 [doi].
48
49
50 501 33 Careau E, Dussault J, Vincent C. Development of interprofessional care plans for spinal cord injury
51 502 clients through videoconferencing. *J Interprof Care* 2010;24:115-8 doi:10.3109/13561820902881627
52 503 [doi].
53
54 504 34 Fitzpatrick D, Grabarz D, Wang L, et al. How effective is a virtual consultation process in
55 505 facilitating multidisciplinary decision-making for malignant epidural spinal cord compression?. *Int J*
56 506 *Radiat Oncol Biol Phys* 2012;84:e167-72 doi:10.1016/j.ijrobp.2012.03.057 [doi].
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

507 35 Tokuda L, Lorenzo L, Theriault A, et al. The utilization of video-conference shared medical
508 appointments in rural diabetes care. *Int J Med Inform* 2016;93:34-41
509 doi:10.1016/j.ijmedinf.2016.05.007 [doi].

510

For peer review only

COREQ checklist

Title of study		Does the multidisciplinary videoconferencing between a head and neck cancer centre and its preferred partner add value to their patient care and to their decision making? A mixed method evaluation.	
Domain Details of Items		Answer	Location in manuscript
Domain 1: research team and reflexivity			
<i>Personal Characteristics [5 items]</i>			
1	Interviewer (Which author/s conducted the interview or focus group?)	LvH	Methods
2	Credentials (What were the researcher's credentials? E.g. PhD, MD)	MSc	Author's information
3	Occupation (What was their occupation at the time of the study?)	Sr. Consultant Quality and Patient Safety	Author's information
4	Gender	Female	Author's information
5	Experience & Training	LvH is consultant & trainer and is experienced using diverse qualitative analysis and improvement methods.	CV in Research file
<i>Relationship with participants [3 items]</i>			
6	Prior Relationship (Was a relationship established prior to study commencement?)	Researcher participates in the research group of the Head & Neck Oncology care pathway and was attending videoconferencing before start of this study.	CV in Research file
7	Participant knowledge of interviewer (e.g. personal goals, reasons for doing the research)	As a researcher, but not personal.	-
8	Interviewer characteristics (e.g. Bias, assumptions, reasons and interests in the research topic)	Researcher supports as Quality coordinator the University Medical Centre for many patient flows, including the Head & Neck Oncology care pathway .	CV in Research file
Domain 2: study design			
<i>Theoretical framework [1 item]</i>			
9	Methodological orientation and Theory (What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis)	Content analysis	Methods
<i>Participant selection [4 items]</i>			
10	Sampling (e.g. purposive, convenience, consecutive, snowball)	Consecutive	Methods
11	Method of approach (e.g. face-to-face, telephone, mail, email)	Face-to-face	Methods

12	Sample size (How many participants were in the study?)	3 specialists of centre and partner team.	Methods
13	Non-participation (How many people refused to participate or dropped out? Reasons?)	None	Methods
<i>Setting [3 items]</i>			
14	Setting of data collection (Where was the data collected? e.g. home, clinic, workplace)	Data of interviews were collected in the clinic	Methods
15	Presence of non-participants (Was anyone else present besides the participants and researchers?)	No	
16	Description of sample (What are the important characteristics of the sample? e.g. demographic data, date)	Patients & tumour characteristics; participating specialists	Methods, results, table 2; methods, results.
<i>Data collection [7 items]</i>			
17	Interview guide (Were questions, prompts, guides provided by the authors? Was it pilot tested?)	Interviews were semi-structured using an interview guide schedule; follow up questions were allowed. Participants were also asked to point out improvements.	Methods, textbox 1.
18	Repeat interviews (Were repeat interviews carried out? If yes, how many?)	No	Methods
19	Audio/visual recording (Did the research use audio or visual recording to collect the data?)	The semi-structured interviews were audio recorded using a smartphone.	Methods
20	Field notes (Were field notes made during and/or after the interview or focus group?)	Researcher observations were registered during the videoconferencing registration period and used for set-up of questions in the semi-structured interview phase and for development of minor themes in the coding tree.	Methods
21	Duration of interviews	25 to 40 minutes.	Methods
22	Data saturation (Was data saturation discussed?)	Pre-selected participants were all interviewed: 3 specialists from each team representing all medical specialisms in the videoconferencing.	Methods
23	Transcripts returned (Were transcripts returned to participants for comment and/or correction?)	Transcripts were returned to the	Methods

		participants with quotes. To check results the member check method (Synthesized Member Checking, Birt et al. 2016) was used.	
Domain 3: analysis and findings			
<i>Data analysis – 5 items</i>			
24	Number of data coders	One made codes, a second used the codes	Methods
25	Description of coding tree	Yes	Methods, results table 4
26	Derivation of themes (Were themes identified in advance or derived from the data?)	Major themes were derived from the research questions and minor themes were derived from researcher's field notes during analysis.	Methods, results
27	Software (to manage the data)	Word, Excel, SPSS	Methods
28	Participant checking (Did participants provide feedback on the findings?)	To check results the member check method (Synthesized Member Checking, Birt et al. 2016) was used.	Methods
<i>Reporting [4 items]</i>			
29	Quotations presented (Were participant quotations presented to illustrate themes/ findings? Was each quotation identified? E.g. participant number)	Quotes are provided as illustration of main findings and are attributed to particular type of participants.	Methods, results
30	Data and findings consistent (Was there consistency between the data presented and the findings?)	Yes, the same patterns were observed with all participants.	Results, discussion
31	Clarity of major themes (Were <i>major</i> themes clearly presented in the findings?)	Coding tree (see underneath, last row)	Methods, results, table 4
32	Clarity of <u>minor</u> themes (Is there a description of diverse cases or discussion of minor themes?)	Yes	Results, discussion
Coding tree contains the following <i>Major</i> and <i>Minor</i> themes within a major theme: <i>Recommendation: Nuance, Follow-up traceable?, Aligning, Knowledge Added Value?: Videoconference session, Team completeness, Collaboration: Communication, Trust, Expertise, Dutch Health Care Inspectorate (DHCI) requirement Planning: Logistics, Preparation, Commitments. Equipment Scientific Research</i>			

BMJ Open

Does multidisciplinary videoconferencing between a head and neck cancer centre and its partner hospital add value to their patient care and decision making? A mixed method evaluation

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2018-028609.R1
Article Type:	Original research
Date Submitted by the Author:	26-Jul-2019
Complete List of Authors:	van Huizen, Lidia; University of Groningen, University Medical Center Groningen, Quality and Patient Safety; Oral and Maxillofacial Surgery Dijkstra, Pieter; University of Groningen, University Medical Center Groningen, Centre for Rehabilitation Halmos, Gyorgy; University of Groningen, University Medical Center Groningen, Ear, Nose and Throat van den Hoek, Johanna; University of Groningen, University Medical Center Groningen, Radiotherapy van der Laan, Klaas; Medical Center Leeuwarden, Ear, Nose and Throat Wijers, Oda; Radiotherapeutic Institute Friesland Ahaus, Kees; University of Groningen, Faculty of Economics and Business, Operations; Erasmus Universiteit Rotterdam, Erasmus School of Health Policy & Management de Visscher, Jan; Medical Center Leeuwarden, Oral and Maxillofacial Surgery; Free University Medical Center, Oral and Maxillofacial Surgery / Oral Pathology Roodenburg, Jan; University of Groningen, University Medical Center Groningen, Oral and Maxillofacial Surgery
Primary Subject Heading:	Oncology
Secondary Subject Heading:	Health policy, Qualitative research
Keywords:	Videoconferencing, Collaborating teams, Mixed method study, Added value, Head & neck tumours < ONCOLOGY, Multidisciplinary team meetings (MDT)

SCHOLARONE™
Manuscripts

1
2
3 1 **Does multidisciplinary videoconferencing between a head-and-neck cancer centre and its**
4 **partner hospital add value to their patient care and decision-making? A mixed method**
5 **evaluation**
6
7
8
9
10 4

11 5 Lidia S. van Huizen (LvH), MSc^{1,2}, corresponding author, l.s.van.huizen@umcg.nl,

12 6 +31 50 361 8035

13 7 Pieter U. Dijkstra (PD), PT, PhD^{1,3}, p.u.dijkstra@umcg.nl

14 8 Gyorgy B. Halmos (GH), MD, PhD⁴, g.b.halmos@umcg.nl

15 9 Johanna G.M. van den Hoek (JvdH), MD⁵, j.g.m.van.den.hoek@umcg.nl

16 10 Klaas T. van der Laan (KvdL), MD, PhD⁶, author deceased May 4th 2019

17 11 Oda B. Wijers (OW), MD, PhD⁷, o.b.wijers@skf-rif.nl

18 12 Kees (C.)T. B. Ahaus (KA), PhD^{8,9}, ahaus@eshpm.eur.nl

19 13 Jan G.A.M. de Visscher (JdV), DMD, MD, PhD^{10,11}, j.de.visscher@znb.nl

20 14 Jan L.N. Roodenburg (JR), DDS, MD, PhD¹, j.l.n.roodenburg@umcg.nl

21 15 ¹ University of Groningen, University Medical Center Groningen, Department of Oral and
22 Maxillofacial Surgery, Groningen, The Netherlands

23 16 ² University of Groningen, University Medical Center Groningen, Department of Quality and
24 Patient Safety, Groningen, The Netherlands

25 17 ³ University of Groningen, University Medical Center Groningen, Centre for Rehabilitation,
26 Groningen, The Netherlands

27 18 ⁴ University of Groningen, University Medical Center Groningen, Department of Ear, Nose &
28 Throat / Head and Neck Surgery, Groningen, The Netherlands

29 19 ⁵ University of Groningen, University Medical Center Groningen, Department of Radiotherapy,
30 Groningen, The Netherlands

31 20 ⁶ Medical Centre Leeuwarden, Department of Ear, Nose & Throat, Leeuwarden, The Netherlands

32 21 ⁷ Radiotherapeutic Institute Friesland, Leeuwarden, the Netherlands

33 22 ⁸ University of Groningen, Faculty of Economics and Business, Centre of Expertise Healthwise,
34 University Medical Center Groningen, Groningen, The Netherlands

1
2
3 29 ⁹ Erasmus University, Erasmus School of Health Policy & Management, Rotterdam, The
4
5 30 Netherlands

6
7 31 ¹⁰ Medical Centre Leeuwarden, Department of Oral and Maxillofacial Surgery, Leeuwarden, The
8
9 32 Netherlands

10
11 33 ¹¹ Free University Medical Center, Department of Oral and Maxillofacial Surgery / Oral
12
13 34 Pathology, Amsterdam, The Netherlands

15 35 **ABSTRACT**

17 36 **Objectives**

18
19
20 37 Given the difficulties in diagnosing and treating head-and-neck cancer, care is centralized in the
21
22 38 Netherlands in eight head-and-neck cancer centres and six satellite regional hospitals as preferred
23
24 39 partners. A requirement is that all patients of the partner should be discussed in a multidisciplinary
25
26 40 team meeting (MDT) with the head-and-neck centre as part of a Dutch health policy rule. In this
27
28 41 mixed method study, we evaluate the value that the video-conferenced MDT adds to the MDTs in the
29
30 42 care pathway, quantitative regarding recommendations given and qualitative in terms of benefits for
31
32 43 the teams and the patient.

34 44 **Design**

35
36
37 45 A sequential mixed method study

38 46 **Setting**

39
40
41 47 One oncology centre and its partner in the Northern part of the Netherlands

42 48 **Participants**

43
44
45 49 Head-and-neck cancer specialists presenting patient cases during video-conferenced MDT over a
46
47 50 period of six months. Semi-structured interviews held with six medical specialists, three from the
48
49 51 centre and three from the partner.

50 52 **Primary and secondary outcome measures**

51
52
53 53 Percentage of cases in which recommendations were given on diagnostic and/or therapeutic plans
54
55 54 during video-conferenced MDT.

56 55 **Results**

1
2
3 56 In eight of the 336 patient cases presented (2%), specialists offered recommendations to the
4
5 57 collaborating team (3 given from centre to partner and 5 from partner to centre). Recommendations
6
7 58 mainly consisted of alternative diagnostic modalities or treatment plans for a specific patient.
8
9 59 Interviews revealed that specialists perceive added value in discussing complex cases because the
10
11 60 other team offered a fresh perspective by hearing the case 'as new'. The teams recognize the
12
13 61 importance of keeping their medical viewpoints aligned, but the requirement (that the partner should
14
15 62 discuss all patients) was seen as out-dated.

17 63 **Conclusions**

18
19
20 64 The added value of the video-conferenced MDT is small considering patient care, but the specialists
21
22 65 recognized that it is important to keep their medical viewpoints aligned and that their patients benefit
23
24 66 from the discussions on complex cases.

25 67 **Keywords**

26
27
28 68 Videoconferencing (MeSH term), head-and-neck cancer, collaborating teams, multidisciplinary team
29
30 69 meetings (MDT), added value, mixed method study

31 70 **Strengths and limitations of this study**

- 32
33
34
35 71 • The study evaluates in depth the video-conferenced MDT between the centre and the partner
36
37 72 in the head-and-neck oncology care pathway and refocuses on benefits and drawbacks
38
39 73 (strength)
40
41 74 • Participating specialists from different specialisms and locations were interviewed and
42
43 75 identified benefits and drawbacks of the videoconference meetings (strength)
44
45 76 • The researcher's presence during video conferenced MDT may have influenced the
46
47 77 communication between the centre and the partner, also called 'Hawthorne effect' (limitation)
48
49 78 • Only one of the six centres and its preferred partner in the Netherlands was studied
50
51 79 (limitation)

52
53
54 80 **Wordcount 3993**

55
56 81

82 INTRODUCTION

83 Most tumours in the head or neck region (nasal cavity, paranasal sinuses, lips, mouth, salivary glands,
84 throat or larynx and complex skin malignancies) are fast growing tumours¹. This implies that a long
85 interval between the moment of referral and the start of the primary treatment (surgery, radiotherapy
86 and/or chemotherapy) can lead to tumour progression with less survival chance². Because of
87 complexity of diagnostic procedures and therapeutic modalities and low volume of patients, head-and-
88 neck cancer care is centralized in multidisciplinary head-and-neck cancer centres³. In 1984, the Dutch
89 Head & Neck Society (DHNS) was founded as a scientific organization. Later the DHNS became
90 involved in the nationwide organization of head-and-neck cancer care. As a result, since 1993, head-
91 and-neck cancer patients in the Netherlands are treated in eight head-and-neck cancer centres
92 recognized by the DHNS; six centres have preferred partners⁴. Within each head-and-neck cancer
93 centre, multidisciplinary meetings according to national evidence-based guidelines are mandatory to
94 provide the best diagnostic work up and treatment for patients, and to sustain the quality of care in the
95 oncology centres^{5,6,7,8}. Criteria for qualifying as centre: are having the specialisms with expertise to
96 treat the tumour, having the necessary diagnostic and therapeutic facilities and treating at least 200
97 new patients each year. Partners fulfil the same criteria, but should treat at least 80 new patients.

98 In 1997, after an informal collaboration period of 4 years, the Medical Centre Leeuwarden
99 became the formal preferred partner of the Head-and-Neck Cancer Centre of the University Medical
100 Centre Groningen⁹, further referred to as the “partner” and the “centre”. The collaboration of a centre
101 with its partner is based upon trust and sustainable agreements on governance aspects, evidence based
102 multidisciplinary decision-making and use of facilities^{10, 11, 12}. The collaboration consists of weekly
103 multidisciplinary team meetings (MDTs) between centre and partner to discuss diagnostic and
104 therapeutic plans. The efficiency of the MDTs is important for decision-making and care pathway
105 management. The centre’s MDT regarding diagnostics and treatment involves more than 9 disciplines
106 (details presented elsewhere)¹³. The teams of centre and partner meet face-to-face three times a year,
107 where governance, guidelines and research projects are discussed.

108 The DHNS and the Dutch Health Care Inspectorate (DHCI) require that all new patients of the
109 partner are discussed in a weekly MDT with the centre¹⁴. This DHCI requirement can be seen as

1
2
3 110 quality control over the partner clinic. Specialists from centre and partner, from the departments of
4
5 111 oral and maxillofacial surgery (OMS), ear, nose and throat (ENT) and radiotherapy (RT) participate.
6
7 112 This weekly MDT is additional to a local MDT in the hospital where the patient is first seen and will
8
9 113 be treated. Initially, these collaborative multidisciplinary weekly meetings were in the centre: three
10
11 114 specialists travelled to the oncology centre (2 hours traveling time and 2 hours MDT). When
12
13 115 videoconferencing became available, it became the preferred method for this communication.^{15, 16} The
14
15 116 video-conferenced MDT is scheduled after the local MDT. During the videoconferencing, the partner
16
17 117 presents all patient cases, including available imaging, and proposed diagnostic and therapeutic plan.
18
19 118 The centre presents complex cases or cases interesting to discuss. Both sides are free to offer
20
21 119 recommendations. The team presenting the patient case is responsible for documenting changes when
22
23 120 a recommendation is implemented.

24
25
26 121 Recommendations from both teams to the decision-making regarding diagnostic and therapeutic
27
28 122 plans may add value to the quality of patient care^{17, 18}. We decided to evaluate the video-conferenced
29
30 123 MDT as part of the collaboration agreements because it was time consuming and there was a wish to
31
32 124 refocus on benefits and drawbacks.

33 34 125 **Research Question**

35
36 126 Aim of this study was to analyse the value of video-conferenced MDT in the treatment of head-and-
37
38 127 neck cancer patients in the care pathways, resulting in two questions.

- 39 128 1. How often are recommendations given on diagnostic and/or therapeutic plans by the teams
40
41 129 during video-conferenced MDT?
- 42
43 130 2. What benefits and drawbacks of the videoconference are perceived by the specialists in the
44
45 131 teams?

46 47 132 **DESIGN**

48
49 133 This mixed method study^{19, 20, 21} had a quantitative part followed by a qualitative part. The primary
50
51 134 outcome of the weekly video-conferenced MDT was the percentage of cases in which
52
53 135 recommendations on diagnostic and/or treatment plans were given. The secondary outcome were the
54
55 136 benefits or drawbacks of the MDT video conference perceived / experienced by the participating
56
57
58
59
60

1
2
3 137 specialists. In the study period, the teams acted conform the DHCI requirement that all patients of the
4
5 138 partner should be presented in a multidisciplinary meeting with the centre.

7 139 **Videoconferencing equipment used**

9 140 The video-conferenced MDT was held in dedicated multidisciplinary meeting rooms, where screens
10
11 141 can be operated with two to four computers with monitors. While the patient data is presented on the
12
13 142 first screen, teams can see each other on the second screen. The videoconferencing is operated via the
14
15 143 'Webex'-application and a camera. Both locations call into a special safe 'chat room'.

17 144 *Centre:* dedicated 20-seat VC room with three screens - beamers (software / provider Kinly;
18
19 145 bandwidth 2 Mbps) and five camera inputs. Four computer stations, one dedicated for Radiology
20
21 146 showing PACS Imaging.

23 147 *Partner:* dedicated 10-seat VC room with one screen with possibility to see patient data and the other
24
25 148 team; one computer log-on to patient dossiers showing data and imaging.

27 149 **Patient data**

28
29 150 Data of all patients presented by one of the teams during the video-conferenced MDT
30
31 151 videoconferences between September 2016 and February 2017 were included. The tumour
32
33 152 localization, histology and tumour stage were registered for all patients that were presented.

35 153 **Patient involvement in study design**

36
37 154 Patients were not involved in the study because the main purpose of the study was to evaluate the
38
39 155 added value of the DHCI requirement in a weekly video-conferenced MDT.

41 156 **Quantitative part**

43 157 *Sample size calculation recommendations*

44
45 158 In a 4-week pilot study of 4 sessions including 46 cases, carried out 9 months before study start, we
46
47 159 found that in approximately 20% of cases a recommendation was given. To estimate this percentage
48
49 160 with a 10% precision (95 % confidence interval: 15.5 % to 25.4 %) would require 250 cases. On
50
51 161 average, 15 cases were discussed at each weekly video-conferenced MDT. We estimated that six
52
53 162 months would be sufficient to acquire the necessary 250 cases. The pilot study was also used to
54
55 163 operationalize the primary outcome measure.

57 164 *Recommendation registration*

1
2
3 165 Recommendations were registered with the relevant data from electronic and written medical records
4
5 166 on a clinical registration form by LvH during the videoconference. Each recommendation was
6
7 167 assessed by the two teams with respect to change impact (minor or major, Table 1a) on the diagnostic
8
9 168 and/or therapeutic plan, case complexity, use of national multidisciplinary guidelines for the
10
11 169 diagnostic and/or treatment plan, and comorbidity of the patient (Table 1b). LvH registered the given
12
13 170 recommendation with the relevant data; JdV and JR verified the registrations. During the
14
15 171 videoconferencing sessions, field notes were taken by LvH.

172 **Table 1.** Definitions of change impact and case complexity

173 **Table 1a** Operational definitions of major and minor changes in diagnostic or treatment plan

	diagnostic plan	treatment plan	remarks
minor	additional more-detailed MRI or CT-thorax of the area already imaged	logistic change	
major	additional MRI or CT-thorax in a different area from the area already imaged	change in modality: adding or deleting a therapeutic modality; surgery radiotherapy or chemotherapy	
criterion	addition of diagnostic plan in a different area than already investigated	adding or deleting a treatment modality from the treatment plan in the proposed or in a different area	after the major/minor decision is made, the decision registered in the research form will be verified by both specialists (giver and receiver)

174

175 **Table 1b** Operational definition of case complexity

	modality	guideline	comorbidity
not complex	unimodal treatment	diagnosis and treatment follows guideline	no comorbidity
complex	multimodal treatment	diagnosis and/or treatment does not follow guideline	comorbidity
remark	- unimodal: surgical procedure chemotherapy primary radiotherapy - multimodal: reconstruction surgery chemo- or bio- radiotherapy	which guidelines are followed	

176

177 *Statistical analysis*

178
179
180

178 Differences in age, gender, tumour localization and tumour histology (ICD(O))²², and tumour stage
 179 between cases presented by the centre and those presented by the partner were analysed using t-test for
 180 independent samples, Chi-Squared test, and Chi-Squared test exact procedure if requirements for the
 181 Chi-Square test were not met. Statistical analyses were performed using SPSS 23.0 for Windows
 182 software. In all analyses, statistical significance was set at the 5% level.

183 **Qualitative part**

184 *Interviews*

185 Semi-structured interviews were conducted with six medical specialists that attended the meetings
 186 most frequently, one from the OMS-, ENT- and RT-department of each team, to explore the added
 187 value of the video-conferenced MDT. The field notes taken by the researcher during the video-
 188 conferenced MDT were used to develop the questions for the semi-structured interviews. After
 189 receiving verbal informed consent from the specialists, the semi-structured interviews started with
 190 providing information about the recommendations given. Thereafter it continued with the open
 191 question ‘What do you think is the value of the videoconference between the head-and-neck cancer
 192 centre and their preferred partner?’. LvH then guided the interview using a short topic list including
 193 ‘added value’ and ‘perceived possibilities for change or improvement in the video-conferenced MDT’
 194 (Textbox 1). The different topics were introduced in a flexible way, and the interviews took the form
 195 of natural conversations.

196 **Textbox 1 Interview Guide**

Topics	Questions
Added value videoconferencing	What do you think is the added value of the video-conferenced MDT between the head-and-neck cancer centre (centre) and their preferred partner (partner)? Could you mention strong points of the video-conferenced MDT? Could you give examples? Could you name points for improvement? Could you mention examples?
Role of specialism in videoconference	What do you think the role of a specialist is in the video-conferenced MDT between centre and partner? The consultation is required by the Dutch Head and Neck Society and the Dutch Health Care Inspectorate, how usefulness do you think it is? Would you advise stopping the consultation if it was not mandatory?
Results interpretation	Have you given recommendations to the centre/partner? Have you received recommendations from the centre/partner? Could you indicate what the difference is between peer consultation and giving a recommendation? What do you think would be an ideal video-conferenced MDT? Could you

1
2
3 explain your answer?

4 What do you think could be adjusted in the video-conferenced MDT to
5 make the consultation more effective and more efficient?
6

7 197 Interviews lasted between 25 and 40 minutes, were audio recorded and transcripts of the
8
9 198 interviews were made. The participants were asked to review the transcripts and extracted quotes,
10
11 199 related to perceived added value, possible improvements and the role of a specialist in the video-
12
13 200 conferenced MDT.
14

15 201 *Thematic analysis*

16
17 202 Quotes were anonymized and coded for their relevance to possible benefits or drawbacks for the
18
19 203 collaboration between the teams and for patient care. The first stage of this inductive analysis of the
20
21 204 interviews involved two authors, JR and JdV, in an initial open coding procedure that resulted in a list
22
23 205 of codes corresponding closely to the text fragments extracted from the six interviews. The codes were
24
25 206 placed in a coding tree using a thematic analysis approach with main themes recommendations, added
26
27 207 value, collaboration and planning^{23, 24}. Codes were judged as being a benefit or a drawback. Any
28
29 208 disagreements during the coding were discussed between the coders and the researcher²⁵. After the
30
31 209 preliminary results were collated, for credibility a member check was performed with participants.²⁶
32
33
34 210 The Clinical Research Office performed a planned quality check on data management.
35

36 211 **RESULTS**

37 212 **Quantitative analysis**

38
39 213 From September 2016 to February 2017, 82 patients were presented by the centre and 177 by the
40
41 214 partner in 18 weekly video-conferenced MDTs (Table 2). In this period of 22 weeks, three meetings
42
43 215 were cancelled due to a 'medical complication meeting', a technical problem to connect and a holiday
44
45 216 recess. Further, the researcher could not attend one session.
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

217 **Table 2** Patients and their tumour characteristics, as presented during videoconference meetings

Number of patients (total n=259) (n=number of available data)	centre (n=82)		partner (n=177)		statistics, p =
	mean	SD	mean	SD	
Age (Mean, SD)	67.8	15.2	66.7	16.1	(<i>t-test</i>) .533
Gender (n=259)	<i>n</i>	%	<i>n</i>	%	(<i>Chi</i> ²) .394
Female	27	10	68	26	
Tumour localization (n=206*)	<i>n</i>	%	<i>n</i>	%	(<i>Chi</i> ^{2-exact}) < .001
Lip (C00)	3	3	4	2	
Oral cavity	21	23	29	12	
Tongue (C01, C02)	6	-	11	-	
Gums (C03)	5	-	7	-	
Floor of mouth (C04)	4	-	4	-	
Oral cavity, unspecified (C05, C06, C14)	6	-	7	-	
Major salivary glands (C07, C08)	2	2	7	3	
Oropharynx (C09,C10)	7	8	6	2	
Nasopharynx (C11)	0	0	0	0	
Nasal Cavity (C30)	2	2	3	1	
Hypopharynx (C12, C13)	5	5	5	2	
Sinus (C31)	3	3	3	1	
Larynx (C32)	10	11	15	6	
Bronchus and Lung (C34)	0	0	5	2	
Hematologic and reticuloendothelial systems (C42)	0	0	11	5	
Skin (C44)	14	15	35	14	
Lymph nodes (C77)	2	2	1	0	
Unknown (C80)	3	3	0	0	
Miscellaneous (C20, 33, 41, 49, 50, 64, 73)	3	3	7	3	
Unknown (C80)	3	3	0	0	
Morphology or cell type (n=259)	<i>n</i>	%	<i>n</i>	%	(<i>Chi</i> ²) < .001
Squamous cell carcinoma (SCC)	57	72	78	44	
Basic cell carcinoma (BCC)	3	4	6	3	
Melanoma	0	0	11	6	
Miscellaneous malignant	7	9	9	5	
Benign	2	2	18	10	
Infection – premalignant abnormalities	2	2	12	7	
Miscellaneous	11	13	43	24	
T-stage (n=159**)	<i>n</i>	%	<i>n</i>	%	(<i>Chi</i> ²) < .001
T1	13	14	42	17	
T2	20	22	20	8	
T3	8	9	9	4	
T4	25	27	14	6	
Tx	7	8	1	1	

*= only tumour localization if tumour diagnosed; **= only TNM-code if firstly diagnosed, so there are more patients in which 'localization' is known (i.e. for relapse or tumour residue or metastases).

In total 336 cases presented: 93 by centre and 243 by partner.

218

1
2
3 219 Most of the centre's patients (71 out of 82 – 86%) were presented only once, nine were
4
5 220 presented twice (11 %), one patient was discussed three times and another four times. Whereas 111
6
7 221 patients were presented only once (63%) by the partner. Generally patients of the partner where
8
9 222 presented twice or three times: the first time their diagnostic plan, the second time the therapeutic plan
10
11 223 and sometimes surgical results the third time (55 out of 177 – 31%). Only one patient was discussed
12
13 224 four times; five patients on the partner's list were not discussed at the first opportunity because
14
15 225 imaging was not complete.

16
17
18 226 The partner presented significantly ($p < .001$) more cases with infections that were initially
19
20 227 suspected malignancy, T1-stage patients and non-complex cases. Tumour localization and histology
21
22 228 differed also significantly between centre and partner (Table 2). In 61% of the 18 videoconferences
23
24 229 both teams were complete; the centre team was not complete in 22% (n=4) and, in 17% (n=3), the
25
26 230 partner team was not complete. On those occasions one of the other specialisms would present the
27
28 231 cases, for example OMS for ENT. The centre's ENT department was represented in most meetings by
29
30 232 an ENT-specialist training to be a head-and-neck oncology surgeon. The centre presented on average
31
32 233 5.2 (SD 2.4) cases per videoconference, the partner presented on average 13.5 (SD 3.9) cases.

34 234 **Recommendations given**

35
36
37 235 Recommendations were given in eight of the 336 cases presented (2%; 95% confidence interval: 1 to
38
39 236 5%) relating to eight of the 259 patients (3%; 95% confidence interval: 1 to 6%).

40
41 237 Of these recommendations, five were major and three minor (Table 3). Four recommendations
42
43 238 concerned diagnostic plans, and four treatment plans. On three of the eight occasions when a
44
45 239 recommendation was given, the centre's team was incomplete with one of the three specialisms
46
47 240 absent. Seven of the eight recommendations were given by OMS specialists, and five of the eight were
48
49 241 related to ENT patients. Seven of the eight instances occurred on a patient's first presentation and the
50
51 242 other one during a second presentation although, in this case, the imaging had not been complete the
52
53 243 first time. In general, recommendations were given related to the more complex cases, but not
54
55 244 necessarily patients with comorbidity or those with more advanced tumours. About 70% of case were
56
57 245 'formalities' or 'routine patients', meaning patients that fitting the guidelines (well-defined tumours
58
59 246 with limited regional metastases and without comorbidity).

247 **Table 3** Recommendation and its specifics

No	Recommendation	Who	To whom	Team complete?	Recommendation (short)	Change impact, diagnosis or treatment phase	Patient status (ICD-code, TNM-classification, histology; case complexity, guideline used and comorbidity)					
							ICD	TNM	histology	complex?	guideline?	comorbid?
1	2016G10-1 28-09-2016	OMS partner	ENT centre	yes	give patient choice of expectative treatment	major, treatment	C44	T2N0M0	SCC	yes	no	yes
2	2016L14-1 28-09-2016	OMS centre	OMS partner	yes	ultrasound guided biopsy	minor, diagnosis	-	-	maligne lymphoma	no	yes	no
3	2016G32-1 26-10-2016	OMS partner	OMS centre	centre not	use methotrexate to identify malignancy	minor, treatment	C00	T1N0M0	SCC	yes	yes	no
4	2016G39-1 23-11-2016	OMS partner	ENT centre	yes	change surgery approach to retain functionality	major, treatment	C00	T2N0M0	adenoid cystic carcinoma	yes	no	no
5	2016G40-1 23-11-2016	OMS partner	ENT centre	yes	try PDT	major, treatment	C01	T4aN0M0	SCC	yes	no	no
6	2016G51-1 14-12-2016	OMS partner	ENT centre	centre not	consult Ophthalmology	major, diagnosis	C44	T2N0M0	BCC eye corner	yes	no	yes
7	2016L90-2 14-12-2016	OMS centre	ENT partner	centre not	new biopsy	major, diagnosis	C31	T3NxM0	Melan.	yes	yes	yes
8	2017L123-1 04-01-2017	RT centre	OMS partner	yes	add MRI	minor, diagnosis	C07	T1N0M0	SCC	yes	yes	no

Squamous cell carcinoma (SCC), BCC = Basal cell carcinoma, Melan. = Melanoma; MRI = Magnetic Resonance Imaging; PDT = Photo Dynamic Therapy

248

1
2
3 249 **Qualitative analysis – specialist interviews**
4

5 250 During May 2017 six interviews were held. From the transcripts of the six interviews, 107 quotes were
6
7 251 registered. During the coding procedure, items were placed in a coding tree with relevance to the
8
9 252 primary research question (recommendations given) and the secondary research question (perceived
10
11 253 benefits and drawbacks) by the researcher in consultation with the coders. For each major theme,
12
13 254 minor themes were derived from the researcher's field notes. In total 282 scores were given (Table 4).
14
15 255 In several instances the quotes were scored differently although the inter-coder agreement was
16
17 256 acceptable given the possible 37 codes to choose from.

18
19
20 257 Benefits were more frequently mentioned by specialists of the partner, and the drawbacks more
21
22 258 frequently by specialists of the centre. But the majority of codes had a positive connotation for the
23
24 259 video-conferenced MDT (Table 4).
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

260 **Table 4** Coding tree evaluation video-conferenced MDT

Coding tree			Pos?	Code	Code description	Part-ner	Centre	Total	
Videoconferencing	Recom-menda-tion	Nuance	+	22	video-conferenced MDT is mostly 'inter-collegial consultation'	3	3	6	
			+	14	recommendations are nuances, not a totally different medical procedure or diagnostic/treatment plan for a specific patient	7	10	17	
		Follow-up traceable?	+	6	suggestions are taken from others	1	2	3	
			+	20	there is no patient-level evaluation on the implementation of medical procedures agreed, question of trust	3	2	5	
			-	34	sometimes decisions are already taken in relation to continuity of treatment	1	1	2	
		Aligning	+	1	fine-tuning or aligning medical procedures	10	10	20	
			+	9	continue routine cases discussion to prevent deviation from medical procedures	2	2	4	
		Knowledge	0	32	besides videoconferencing also bilateral consultation via telephone	4	1	5	
			+	37	keep 'know how' with routine cases	1	2	3	
		Added Value?	Video-confe-renced MDT	+	8	added value for complex cases vs. routine cases	21	24	45
	-			15	little added value	8	1	9	
	0			27	discuss radio-therapeutic scheme	2	2	4	
	-			29	non-complex cases or 'formalities' are communicated because it is mandatory, no added value	7	1	8	
	+			30	recommendation given to own discipline	5	1	6	
	Team completeness		+	4	presence of all three disciplines is essential	3	4	7	
			+	11	expertise (good) of physician is important	5	3	8	
			0	23	add presence of medical oncology discipline as expertise	2	2	4	
	Collabo-ration		Communi-cation	0	2	working together requires communication	8	2	10
				+	10	at both locations working methods are comparable through video-conferenced MDT	5	2	7
		-		19	initially it was good to consult, added value decreased because teams have grown towards each other	1	1	2	
		Trust	+	5	respectful collaboration	3	7	10	
			+	7	mutual trust	4	5	9	
			+	13	important to know the partner, not only via videoconferencing; good for cohesion	8	7	15	
Expertise		-	18	centre member does not think videoconferencing necessary, because partner should be trusted as such	2	4	6		
		+	26	expertise and new developments from centre to partner	2	2	4		
DHCI		0	21	video-conferenced MDT between centre and partner is a national agreement or policy	2	3	5		

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

Coding tree		Pos?	Code	Code description	Part-ner	Centre	Total
	requirement	-	31	the national policy – to discuss all cases including routine cases – between centre and partner is perceived as out-dated	7	2	9
Plan-ning	Logistics	-	16	stressful, considering other videoconferences	3	6	9
		0	17	integrate video-conferenced MDT in the hospital’s MDT for centre and partner	5	7	12
	Preparation	-	12	improve format of patient presentation	1	1	2
		+	24	good preparation is important	5	4	9
	Commitments	+	25	starting and stopping the video-conferenced MDT on time is important	4	1	5
		0	33	possibly cancel video-conferenced MDT when nothing to discuss	1	1	2
	Equipment	+	3	technique always flawless	1	1	2
		-	35	sometimes video-conferenced MDT did not take place due to technical malfunction	1	1	2
-		36	placement of monitor in the room hinders colleagues and hampers interaction	2	2	4	
Scientific Research		0	28	bias through research setting because researcher is present as observer (Hawthorne effect)	1	1	2
Total quotes					151	131	282

This coding tree has major and minor themes that were derived from the primary research question (recommendations given), the secondary research question (added value as described in benefits and drawbacks perceived) and minor themes derived from researcher’s field notes. One code was related to the research situation.

‘Pos?’ refers to the question: has this code a positive connotation or benefit? + = yes, 185 scores; 0 = neither positive nor negative, 42 scores; - = no, 55 scores.

The amount of codes given is given for the partner, the centre and in total. DHCI is short for Dutch Health Care Inspectorate.

261

1
2
3 262 Six main items were important according to the specialists (quotes in italic).
4

5 263 1. The videoconference adds value when discussing complex cases, through assisting in fine
6
7 264 tuning and aligning medical procedures (code 1, 20x);

9 265 *A patient is presented about which the own team had some discussion, that can be discussed with the*
10
11 266 *partner. In that manner, you get a confirmation or advice to change your treatment plan. This advice*
12
13 267 *can be given by the same specialism, but also by other members of the head-and-neck oncology team*
14
15 268 *(ENT).*

17
18 269 2. Communication is essential for cooperation between teams (code 2, 10x), furthermore it is
19
20 270 important to know the partner well, not only via videoconferencing (code 13, 15x), and to
21
22 271 interact respectfully (code 5, 10x) with mutual trust (code 7, 9x).

23
24 272 *The most important feature of the video-conferenced MDT is to communicate with each other on*
25
26 273 *substantive medical matters, to be on speaking terms, and to know each other (RT).*

27
28 274 *During the videoconferencing, we respect each other, we listen to each other and we are open to each*
29
30 275 *other's additional comments. We trust each other as partners (OMS).*

31
32 276 3. Recommendations are suggested alternatives on diagnostic modalities and treatment plans for
33
34 277 specific patients (code 14, 17x).

35
36 278 *The video-conferenced MDT has the character of a collegial discussion, in which in collaboration the*
37
38 279 *best diagnostic or treatment plan for your patient is reached. Confirmation on your treatment plan*
39
40 280 *adds value too (OMS).*

41
42 281 4. For routine cases that fall within guideline for treatment, the videoconference meeting adds
43
44 282 little value as for changes in medical content, it can even irritate the participants in such cases
45
46 283 (code 15, 9x).

47
48 284 *The video-conferenced MDT sometimes changes the treatment plan for an individual patient. The*
49
50 285 *videoconference is not the meeting where new procedures or guidelines are developed (RT).*

51
52 286 5. There is a wish to integrate the videoconference with the site multidisciplinary meeting in both
53
54 287 hospitals, the centre and the partner (code 17, 12x).

55
56 288 *Integration of the two local multidisciplinary meetings with the video-conferenced MDT could be*
57
58 289 *valuable (ENT).*

1
2
3 290 6. The DHCI requirement (discuss all the partner's cases) has no added value. It is seen as old-
4
5 291 fashioned or out-dated (code 29, 8x).

7 292 *It is better to prepare at a high level and discuss, than to present all the patients and deal with each*
8
9 293 *one briefly. Mutual preparation on special request could have added value, for example a literature*
10
11 294 *search on a complex osteosarcoma case (OMS).*

13 295 **DISCUSSION**

15 296 Our results show that the added value of the weekly video-conferenced MDT between the head-and-
16
17 297 neck cancer centre and the partner hospital was small given the few recommendations made on the
18
19 298 initial diagnostic and/or treatment plan. Nevertheless, the specialists from both sites recognized the
20
21 299 importance of keeping their medical viewpoints aligned through this type of communication.

23 300 Whenever discussing complex cases in which a major change was recommended (in 5 of the 8
24
25 301 recommendations), for example to change the surgical approach to save functionality of organs or
26
27 302 tissue, the recommended change in treatment had a large impact for that patient (Table 3).

28
29 303 The data from the interviews suggest that especially complex patients would benefit from inter
30
31 304 collegial consultation via video-conferenced MDT. If the teams were not obliged to discuss so many
32
33 305 routine cases, they could use the time saved to prepare and discuss complex cases in greater depth²⁷.
34
35 306 The specialists said that they did not want to stop the video-conferenced MDT, because they
36
37 307 appreciate reflecting on diagnostic and treatment plans with trusted expert colleagues.

38
39 308 Because of an increase in patients to be presented in the meeting, we were looking for a more
40
41 309 efficient meeting, which could be reached not discussing the 'formalities' or 'routine patients' (about
42
43 310 70% of patients); developing an evidence based working method would need more research. This
44
45 311 result is supported by a large survey in the UK after 10 years of use of an MDT format, where
46
47 312 specialists also said they wanted to change many components and refocus to spend more time on
48
49 313 complex cases in detail¹⁸.

51
52 314 The qualitative part of this study showed that medical specialists perceived added value in
53
54 315 discussing complex cases in a collegiate consultation, because the other team offers a fresh perspective
55
56 316 by hearing the case 'as new'. Although remarks were often about nuances, the confirmation on the
57
58
59
60

1
2
3 317 chosen treatment by the other team was experienced as helpful. This view is supported in literature
4
5 318 where medical specialists found videoconferencing useful in at least one aspect of their practice¹⁰.

6
7 319 An important requirement to communicate through videoconference is that participants know each
8
9 320 other from personal meetings, to support mutual trust and respect as the basis for cooperation. The
10
11 321 finding that collaboration and cooperation improves when each discipline understands each other's
12
13 322 roles and that specialties working together for a long time do not need many words to come to a
14
15 323 decision was supported previously^{17, 28}.

16
17 324 The video-conferenced MDT can be used to introduce and discuss new developments, protocols
18
19 325 and guidelines leading to comparable quality of care in both locations. Comprehensive cancer centre
20
21 326 teams working together over videoconferencing with a peripheral hospital team, reviewing
22
23 327 radiotherapy planning align their treatment plans (7% major and 21% minor changes)¹⁶ and speed up
24
25 328 follow-up appointments¹⁵.

26
27 329 The video-conferenced MDT differs from the local MDT: complex cases are discussed with a
28
29 330 second 'expert team' of head-and-neck oncology specialists. The patients treated by the centre and
30
31 331 partner are similar, although diagnostics and treatment might differ slightly²⁹, only in case of rare
32
33 332 tumours that need skull base surgery patients travel from partner to centre. In our study the significant
34
35 333 differences in tumour localization, cell type and tumour stage between sites are a consequence of 'the
36
37 334 DHCI requirement' whereas the 'centre' could decide which of its patients would make an interesting
38
39 335 case for discussion. Consequently, the partner presents 3 to 4 times as many patients as the centre. One
40
41 336 third of these (31%) reappeared in the subsequent videoconferences, checking extra diagnostic
42
43 337 information, treatment plan and need for adjuvant therapy. Most of these presentations were seen as a
44
45 338 'formality'.

46
47 339 The perceived value of the video-conferenced MDT might be influenced by the expertise of
48
49 340 specialists. The recommendations given during the evaluation period were mostly given to ENT by an
50
51 341 OMS oncologist who had considerably more clinical experience than his opposing colleague had, and
52
53 342 was one of the instigators of the collaboration. It could be that recommendations given were accepted
54
55 343 more easily if given by a more experienced specialist¹². Videoconferencing enables specialists
56
57
58
59
60

1
2
3 344 acquiring experience with presenting complex oncology patients and with decision-making in teams⁶,
4
5 345 ¹⁷.

7 346 *Limitations of this study*

9 347 Contrary to our findings from the 4-week pilot study (n=46), where advice was offered in 20% of the
10
11 348 presented cases, the actual 2% recommendations is much lower. Although it is difficult to explain this
12
13 349 difference in amount of 'agreed recommendations', we think that the pilot served mainly as a
14
15 350 feasibility check, that helped us to define our research questions and to operationalize the definitions.
16
17 351 Other factors may also have played a role in the difference between the pilot and the actual study.
18
19 352 Firstly, the long-lasting collaboration between the centre and the partner had led to a high level of
20
21 353 alignment on diagnostic and therapeutic 'strategies' or medical viewpoints. Secondly, the participants
22
23 354 were not blinded for the research question. Thus, awareness of being part of an experiment may have
24
25 355 led to a drive to perform well and to present the patients with an optimal diagnostic and treatment plan
26
27 356 (Hawthorne effect). Additionally presence of the researcher might have influenced the communication
28
29 357 between centre and partner. Often the teams mentioned that the other team was asked to give collegial
30
31 358 advice and therefore a suggestion was not always seen as a recommendation. This nuance could also
32
33 359 be interpreted as a social desirable answer, possibly due to the long existing collaboration between the
34
35 360 centre and the partner before study start. Thirdly, some patient cases were only presented as interesting
36
37 361 to discuss. Finally, during the pilot study the advice given was not assessed for its impact.

41 362 In this study, we evaluated the added value of a video-conferenced MDT between one oncology
42
43 363 centre and its preferred partner. In line with other studies^{30,31}, this study showed that, in addition to a
44
45 364 quantitative result (number of recommendations), it is important to reflect on the situation through an
46
47 365 interview process (qualitative results) before starting to implement improvements. The interviews
48
49 366 showed that specialists from both centre and partner support the idea of sustainable collaboration, but
50
51 367 they do not support the view implicit in the DHCI requirement that the centre should act as means of
52
53 368 quality control for the partner³². Our findings on video-conferenced MDTs find support elsewhere in
54
55 369 terms of the positive results on teams working together³³⁻³⁵. Other studies have shown that more
56
57 370 research is needed to understand the effects of video-conferenced MDT on patient outcomes, such as
58
59
60

1
2
3 371 finance including resource usage^{36,37}, what fields of specialisms could benefit from the medium^{28,38},
4
5 372 participant satisfaction³⁹, throughput times⁴⁰ and self-management for patients⁴¹.

6
7 373 In summary we believe that the DHCI requirement (the partner should discuss all patients with
8
9 374 the centre) is unnecessary in the case of routine patients, since it does not add value to the quality of
10
11 375 their treatment. It is more useful to spend time to discuss complex cases in greater detail. We propose
12
13 376 the following measures that will add value to the weekly video-conferenced MDT:

- 14
15 377 1. All the participating medical specialists should be granted freedom to select only complex or
16
17 378 interesting cases that could serve to keep medical procedures aligned.
18
19 379 2. The partner should not be obliged to present cases seen as 'routine patients' since this does not
20
21 380 add value.
22
23 381 3. The video-conferenced MDT should be organized as an integral part of the partners' MDT and
24
25 382 not as a separate weekly meeting.
26
27 383 4. Accepted, mature processes should be regularly reassessed and refocused in order to enable new
28
29 384 collaboration strategies.
30
31

32
33 385 Based on our findings on the added value of the multidisciplinary videoconference between the
34
35 386 head-and-neck centre and its partner and our suggestions for improvements, we would advise the
36
37 387 DHNS, along with healthcare policymakers, to reconsider the DHCI requirement.

38
39 388 In our study, we found that there are clinical and practical implications on how and when to start
40
41 389 with videoconferencing instead of meetings with physical attendance. Videoconferencing must be seen
42
43 390 as a supportive medium for communication within a sustainable collaboration of parties that
44
45 391 understand each other's roles and work with guidelines or protocols.

46
47 392 Participants of a videoconference should:

- 48
49 393 1. Know each other, and meet face-to-face on a regular basis, which serves cohesion
50
51 394 (management meetings on governance, guideline developments and research projects are
52
53 395 ideal for this purpose).
54
55 396 2. Respect each other as 'expert / knowing' colleague and know each other's role in the
56
57 397 multidisciplinary treatment of patients.
58
59 398 3. Trust each other in follow-up of changes to diagnostic and treatment plans.
60

399 In view of the above mentioned implications we would not recommend starting with
400 videoconferencing for multidisciplinary meetings if a majority of participants do not know each other.

401 **CONCLUSIONS**

402 The video conferenced MDT has added value in the collaboration and in the care pathway
403 management. When interpreting national multidisciplinary guidelines, centre and partner align their
404 medical policies. This leads to a more efficient use of resources and work force.

405 Conversely, discussing non-complex cases is seen as a burden, and the DHCI requirement to discuss
406 all the partners' cases as out-dated.

407 **LIST OF ABBREVIATIONS**

22	DMD	Doctor of Dental Medicine
24	DDS	Doctor of Dental Surgery
26	MDT	Multidisciplinary Team meeting
28	DHCI	Dutch Health Care Inspectorate
30	DHNS	Dutch Head & Neck Society
32	ENT	Ear, Nose and Throat
34	ICD(O)	International Classification of Diseases (of Oncology)
36	MeSH	Medical Subject Headings
38	OMS	Oral and Maxillofacial Surgery
40	RT	Radiotherapy
42	SPSS	Statistical Package for Social Sciences
44	UMCG	University Medical Center Groningen

408 **DECLARATIONS**

409 **Ethics approval and consent to participate**

410 This prospective observational study on decision-making analysis was checked by the Medical Ethics
411 Review Board of the UMCG (2016, ref. M16.194909), the Netherlands. They concluded that the study
412 is not a 'clinical research study with human subjects' as meant in the Medical Research Involving
413 Human Subject Act (WMO). Informed consent was not required. The Dutch law requires also a
414 privacy statement from the partner in the study, the Medical Centre Leeuwarden (2016, nWMO 187).

1
2
3 415 **Data sharing statement**
4

5 416 Datasets will be available from the corresponding author on request.
6

7 417 **Consent for publication**
8

9 418 Not applicable
10

11 419 **Competing interests:** No authors have competing interests.
12

13 420 **Funding:** This research received no specific grant from any funding agency in the public, commercial
14
15 or not-for-profit sectors.
16

17 422 **Authors' Contribution**
18

19
20 423 LvH was involved in the study design and concept; carried out the study; performed the statistical
21
22 424 analysis and the analysis and interpretation of the data; and drafted the manuscript. PD, KA, JdV and
23
24 425 JR, the supervisor, were involved in the study design and concept, analysis and interpretation of the
25
26 426 data, and revision of the manuscript. JdV and JR were involved in the coding of the interview
27
28 427 quotations, together with LvH. GH, JvdH, KvdL and OW were involved in the acquisition of the data
29
30 428 and the revision of the manuscript.
31

32 429 All authors read and approved the final manuscript.
33

34 430 **Acknowledgements**
35

36 431 This research was sponsored by the University Medical Centre Groningen.
37

38 432 **Authors' information**
39

40
41 433 The University Medical Center Groningen is developing patient centred care pathways for
42
43 434 diverse patient groups including laws and regulations for quality and patient safety. LvH, JR
44
45 435 are working in cooperation with KA to research care pathway implementation in the
46
47 436 Comprehensive Cancer Center Groningen and to develop quality and safety indicators, i.e.
48
49 437 process indicators that predict performance of care pathways and sustainable patient outcome.
50

51
52 438 **REFERENCES**
53

54
55 439 1 Waaijer A, Terhaard CH, Dehnad H, et al. Waiting times for radiotherapy: consequences of volume
56 440 increase for the TCP in oropharyngeal carcinoma. *Radiother Oncol* 2003;66:271-6.
57

58 441 2 Ouwens M, Hermens R, Hulscher M, et al. Development of indicators for patient-centred cancer
59 442 care. *Support Care Cancer* 2010;18:121-30 doi:10.1007/s00520-009-0638-y; 10.1007/s00520-009-
60 443 0638-y.

- 1
2
3 444 3 Policy head and neck cancer care 2013 (in Dutch). Available at:
4 445 <http://www.nwhht.nl/organisatie/missie>.
5
6 446 4 Halmos GB, Bras L, Siesling S, et al. Age-specific incidence and treatment patterns of head and
7 447 neck cancer in the Netherlands-A cohort study. *Clin Otolaryngol* 2018;43:317-24
8 448 doi:10.1111/coa.12991 [doi].
9
10 449 5 Fleissig A, Jenkins V, Catt S, et al. Multidisciplinary teams in cancer care: are they effective in the
11 450 UK?. *Lancet Oncol* 2006;7:935-43 doi:S1470-2045(06)70940-8 [pii].
12
13
14 451 6 Ruhstaller T, Roe H, Thurlimann B, et al. The multidisciplinary meeting: An indispensable aid to
15 452 communication between different specialities. *Eur J Cancer* 2006;42:2459-62 doi:S0959-
16 453 8049(06)00555-7 [pii].
17
18 454 7 Ouwens MM, Hermens RR, Hulscher MM, et al. Impact of an integrated care program for patients
19 455 with head and neck cancer on the quality of care. *Head Neck* 2009;31:902-10 doi:10.1002/hed.21041;
20 456 10.1002/hed.21041.
21
22 457 8 Dutch National Cancer Control Programme. Progress Report on Cancer Control in the Netherlands,
23 458 2005-2010 (Dutch NCCP, Nationaal programma kankerbestrijding). 2010.
24
25
26 459 9 Cijfers over kanker / Figures on cancer. Available at: <http://www.cijfersoverkanker.nl>. Accessed
27 460 May, 6, 2017.
28
29 461 10 Norum J, Jordhoy MS. A university oncology department and a remote palliative care unit linked
30 462 together by email and videoconferencing. *J Telemed Telecare* 2006;12:92-6
31 463 doi:10.1258/135763306776084374 [doi].
32
33 464 11 Bydder S, Nowak A, Marion K, et al. The impact of case discussion at a multidisciplinary team
34 465 meeting on the treatment and survival of patients with inoperable non-small cell lung cancer. *Intern*
35 466 *Med J* 2009;39:838-41 doi:10.1111/j.1445-5994.2009.02019.x [doi].
36
37
38 467 12 Slavova-Azmanova NS, Johnson CE, Platell C, et al. Peer review of cancer multidisciplinary
39 468 teams: is it acceptable in Australia?. *Med J Aust* 2015;202:144-7 doi:10.5694/mja14.00768 [pii].
40
41 469 13 van Huizen LS, Dijkstra PU, van der Laan BFAM, et al. Multidisciplinary first-day consultation
42 470 accelerates diagnostic procedures and throughput times of patients in a head-and-neck cancer care
43 471 pathway, a mixed method study. *BMC Health Serv Res* 2018;18:820,018-3637-1 doi:10.1186/s12913-
44 472 018-3637-1 [doi].
45
46 473 14 SONCOS, Dutch policy on multidisciplinary standardization for oncological care (in Dutch):
47 474 Soncos Normeringsrapport 7, pages 22-26. Available at: [https://www.soncos.org/wp-](https://www.soncos.org/wp-content/uploads/2019/02/Soncos_norm-rapp2019-v7.pdf)
48 475 [content/uploads/2019/02/Soncos_norm-rapp2019-v7.pdf](https://www.soncos.org/wp-content/uploads/2019/02/Soncos_norm-rapp2019-v7.pdf). Accessed 07/11, 2019.
49
50
51 476 15 Farris G, Sircar M, Bortinger J, et al. Extension for Community Healthcare Outcomes-Care
52 477 Transitions: Enhancing Geriatric Care Transitions Through a Multidisciplinary Videoconference. *J Am*
53 478 *Geriatr Soc* 2017;65:598-602 doi:10.1111/jgs.14690 [doi].
54
55 479 16 Seeber A, Mitterer M, Gunsilius E, et al. Feasibility of a multidisciplinary lung cancer
56 480 videoconference between a peripheral hospital and a comprehensive cancer centre. *Oncology*
57 481 2013;84:186-90 doi:10.1159/000345314 [doi].
58
59
60

- 1
2
3 482 17 Gagliardi A, Smith A, Goel V, et al. Feasibility study of multidisciplinary oncology rounds by
4 483 videoconference for surgeons in remote locales. *BMC Med Inform Decis Mak* 2003;3:7,6947-3-7.
5 484 Epub 2003 Jun 19 doi:10.1186/1472-6947-3-7 [doi].
6
7 485 18 Meeting patients' needs. Improving the effectiveness of multidisciplinary teams meetings in cancer
8 486 services. Available at:
9 487 [https://www.cancerresearchuk.org/sites/default/files/full_report_meeting_patients_needs_improving_t](https://www.cancerresearchuk.org/sites/default/files/full_report_meeting_patients_needs_improving_the_effectiveness_of_multidisciplinary_team_meetings_.pdf)
10 488 [he_effectiveness_of_multidisciplinary_team_meetings_.pdf](https://www.cancerresearchuk.org/sites/default/files/full_report_meeting_patients_needs_improving_the_effectiveness_of_multidisciplinary_team_meetings_.pdf). Accessed 07/11, 2019.
11
12
13 489 19 Charmaz K. *Constructing Grounded Theory. A Practical Guide through Qualitative Analysis*.
14 490 London: Sage Publications 2006.
15
16 491 20 Ploch T, Juttman RE, Klazinga NS, et al. *Handbook health research (Handboek*
17 492 *gezondheidszorgonderzoek)*. Houten: Bohn Stafleu van Loghum 2007.
18
19 493 21 O'Brien BC, Harris IB, Beckman TJ, et al. Standards for reporting qualitative research: a synthesis
20 494 of recommendations. *Acad Med* 2014;89:1245-51 doi:10.1097/ACM.0000000000000388 [doi].
21
22
23 495 22 Vlaams Kankerregistratienetwerk. *International Classification of Diseases for Oncology, third*
24 496 *edition, updates (in Dutch): Vlaams Kankerregistratienetwerk 2011:240*.
25
26 497 23 Creswell J, Plano Clark V. *Designing and conducting mixed methods research*. Los Angeles: Sage
27 498 2011.
28
29 499 24 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a
30 500 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349-57
31 501 doi:mzm042 [pii].
32
33 502 25 Gioia DA, Gorley KG, Hamilton AL. Seeking Quality Rigor in Inductive Research: Notes on the
34 503 Gioia Methodology. *Organizational Research Methods* 2012;16:15,16-31
35 504 doi:10.1177/1094428112452151.
36
37
38 505 26 Birt L, Scott S, Cavers D, et al. Member Checking: A Tool to Enhance Trustworthiness or Merely a
39 506 Nod to Validation?. *Qual Health Res* 2016 doi:1049732316654870 [pii].
40
41 507 27 Xylinas E, Roupret M, Kluth L, et al. Collaborative research networks as a platform for virtual
42 508 multidisciplinary, international approach to managing difficult clinical cases: an example from the
43 509 Upper Tract Urothelial Carcinoma Collaboration. *Eur Urol* 2012;62:943-5
44 510 doi:10.1016/j.eururo.2012.08.022 [doi].
45
46 511 28 Stevens G, Loh J, Kolbe J, et al. Comparison of recommendations for radiotherapy from two
47 512 contemporaneous thoracic multidisciplinary meeting formats: co-located and video conference. *Intern*
48 513 *Med J* 2012;42:1213-8 doi:10.1111/j.1445-5994.2012.02817.x [doi].
49
50
51 514 29 de Ridder M, Balm AJM, Baatenburg de Jong RJ, et al. Variation in head and neck cancer care in
52 515 the Netherlands: A retrospective cohort evaluation of incidence, treatment and outcome. *Eur J Surg*
53 516 *Oncol* 2017;43:1494-502 doi:S0748-7983(17)30364-5 [pii].
54
55 517 30 Helck A, Matzko M, Trumm CG, et al. Interdisciplinary expert consultation via a teleradiology
56 518 platform--influence on therapeutic decision-making and patient referral rates to an academic tertiary
57 519 care center. *Rofa* 2009;181:1180-4 doi:10.1055/s-0028-1109733 [doi].
58
59
60

- 1
2
3 520 31 Ottevanger N, Hilbink M, Weenk M, et al. Oncologic multidisciplinary team meetings: evaluation
4 521 of quality criteria. *J Eval Clin Pract* 2013;19:1035-43 doi:10.1111/jep.12022 [doi].
5
6 522 32 Stoffels AR. Cooperation among medical specialists: pain or gain? 2008.
7
8 523 33 Axford AT, Askill C, Jones AJ. Virtual multidisciplinary teams for cancer care. *J Telemed Telecare*
9 524 2002;8 Suppl 2:3-4 doi:10.1177/1357633X020080S202 [doi].
10
11 525 34 Barry N, Campbell P, Reed N, et al. Implementation of videoconferencing to support a managed
12 526 clinical network in Scotland: lessons learned during the first 18 months. *J Telemed Telecare* 2003;9
13 527 Suppl 2:S7-9 doi:10.1258/135763303322596110 [doi].
14
15 528 35 Qaddoumi I, Mansour A, Musharbash A, et al. Impact of telemedicine on pediatric neuro-oncology
16 529 in a developing country: the Jordanian-Canadian experience. *Pediatr Blood Cancer* 2007;48:39-43
17 530 doi:10.1002/pbc.21085 [doi].
18
19 531 36 Sezeur A, Degramont A, Touboul E, et al. Teleconsultation before chemotherapy for recently
20 532 operated on patients. *Am J Surg* 2001;182:49-51 doi:S0002-9610(01)00662-6 [pii].
21
22 533 37 Kunkler IH, Fielding RG, Brebner J, et al. A comprehensive approach for evaluating telemedicine-
23 534 delivered multidisciplinary breast cancer meetings in southern Scotland. *J Telemed Telecare* 2005;11
24 535 Suppl 1:71-3 doi:10.1258/1357633054461804 [doi].
25
26 536 38 Murad MF, Ali Q, Nawaz T, et al. Teleoncology: improving patient outcome through coordinated
27 537 care. *Telemed J E Health* 2014;20:381-4 doi:10.1089/tmj.2013.0100 [doi].
28
29 538 39 Careau E, Dussault J, Vincent C. Development of interprofessional care plans for spinal cord injury
30 539 clients through videoconferencing. *J Interprof Care* 2010;24:115-8 doi:10.3109/13561820902881627
31 540 [doi].
32
33 541 40 Fitzpatrick D, Grabarz D, Wang L, et al. How effective is a virtual consultation process in
34 542 facilitating multidisciplinary decision-making for malignant epidural spinal cord compression?. *Int J*
35 543 *Radiat Oncol Biol Phys* 2012;84:e167-72 doi:10.1016/j.ijrobp.2012.03.057 [doi].
36
37 544 41 Tokuda L, Lorenzo L, Theriault A, et al. The utilization of video-conference shared medical
38 545 appointments in rural diabetes care. *Int J Med Inform* 2016;93:34-41
39 546 doi:10.1016/j.ijmedinf.2016.05.007 [doi].
40
41 547
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Standards for Reporting Qualitative Research (SRQR)*

<http://www.equator-network.org/reporting-guidelines/srqr/>

	Answer	Page/line no(s)
Title and abstract		
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection designs (e.g., interview, focus group) is recommended	Does multidisciplinary videoconferencing between a head-and-neck cancer centre and its partner hospital add value to patient care and decision-making? A mixed method evaluation	Title, page 1
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, designs, results, and conclusions	The abstract is made conform the layout of BMJ Open: Objectives, Design, Setting, Participants, Primary and secondary outcome measures, Results and Conclusions.	Abstract, page 2

Introduction

Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Evaluate the video-conferenced MDT as part of the collaboration agreements because it is time consuming and there is the wish to refocus on benefits and drawbacks.	Introduction, page 4-5
Purpose or research question - Purpose of the study and specific objectives or questions	Research questions: 1. How often are recommendations given on diagnostic and/or therapeutic plans by the teams during video-conferenced MDT? 2. What benefits and drawbacks of the videoconference are perceived by the specialists in the teams?	Introduction, page 5

Designs

Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	Thematic, content analysis	Design, page 8-9
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, designs, results, and/or transferability	The researcher is consultant & trainer and is experienced using diverse qualitative analysis and improvement designs. The researcher supports	Design, page 8-9; authors contribution and authors information, page 22

	as Quality coordinator the University Medical Centre for many care pathways, including the Head & Neck Oncology care pathway.	
Context - Setting/site and salient contextual factors; rationale**	The setting is one oncology centre and its partner in the Northern part of the Netherlands. Data of interviews with specialists of the centre and the partner were collected in the clinic.	Abstract, page 2; design, page 8
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	Pre-selected participants were all interviewed: 3 specialists from each team representing all medical specialisms in the videoconferencing. Interviews were performed between 4 and 22 May 2017.	Design, page 8
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	This study was checked by the Medical Ethics Review Board of the UMCG (2016, ref. M16.194909), the Netherlands. They concluded that the study is not a 'clinical research study with human subjects' as meant in the Medical Research Involving Human Subject Act (WMO). Informed consent was not required. The Dutch law requires also a privacy statement from the partner in the study, the Medical Centre Leeuwarden (2016, nWMO 187).	Declarations, page 21
Data collection designs - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/designs, and modification of procedures in response to evolving study findings; rationale**	The semi-structured interviews were audio recorded using a smartphone between May 4 and 22, 2017.	Design, page 8-9; results, page 13.
Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Interviews were semi-structured using an interview guide; follow up questions were allowed. Participants were also asked to point out improvements.	Design, page 8-9
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	6 specialists participating in the video-conferenced MDT were interviewed.	Design, page 8-9; Results, page 13-17.

1 2 3 4 5 6 7 8 9 10 11	Data processing - Designs for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Interviews were recorded and transcripts with quotes were returned to the participants for verification. Quotes were anonymized before data-coders started. One data-coder developed codes, a second applied the codes.	Design, page 9
12 13 14 15 16 17	Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Major themes were derived from the research questions and minor themes were derived from researcher's field notes during analysis.	Design, page 9
18 19 20 21 22 23 24 25 26 27 28 29 30 31	Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	All results were summarized and were sent to the participants to check credibility using the member check (Synthesized Member Checking, Birt et al. 2016). A 'quality check' of data management was performed by the university hospital Clinical Research Office-department in January 2018.	Design, page 8-9

Results/findings

32 33 34 35 36 37 38 39	Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	One data-coder developed codes, a second applied the codes. The researcher made the coding tree; that was verified by the coder that developed the codes.	Results, page 13-17
40 41 42 43	Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Coding tree in table 4, examples of quotes in results.	Results, page 13-17

Discussion

44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	In total 2% recommendations were found in the quantitative part of the study. In interviews with participants of the video-conferenced MDT we found benefits and drawbacks; the specialists recognize that it is important to keep their medical viewpoints aligned and that their patients benefit from the discussions on complex cases; discussing non-complex cases is seen as	Discussion, page 17-21
--	---	--	------------------------

	a burden, and the DHCI requirement to discuss all the partner's cases as out-dated.	
Limitations - Trustworthiness and limitations of findings	<p>1. The researcher's presence during video conferenced MDT may have influenced the communication between the centre and the partner, also called 'Hawthorne effect' (limitation)</p> <p>2. Only one of the six centres and its preferred partner in the Netherlands was studied (limitation)</p>	Limitations page 2; Discussion, subheading limitations of this study, page 19-20

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Competing interests: none declared	page 22
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	None	page 22

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, design, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014; DOI: 10.1097/ACM.0000000000000388