Disease Management Project Breast Cancer in Hesse – 5-Year Survival Data

Successful Model of Intersectoral Communication for Quality Assurance

Disease Management Programm Brustkrebs in Hessen – 5-Jahres-Überlebensdaten

Das Erfolgsmodell der intersektoralen Kommunikation in der Qualitätssicherung

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Key words
- breast cancer
- disease management programme
- quality assurance
- survival
- network

Schlüsselwörter
- Mammakarzinom
- Disease-Management-Programm
- Qualitätssicherung
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Abstract

Introduction: The Disease Management Project Breast Cancer (DMP Breast Cancer) was first launched in Hesse in 2004. The project is supported by the health insurance companies in Hesse and the Professional Association of Gynaecologists in Hesse. The aim is to offer structured treatment programmes to all women diagnosed with breast cancer in Hesse by creating intersectoral cooperations between coordinating clinics, associated hospitals and gynaecologists in private practice who registered in the DMP programme.
Method: Between 1 January 2005 and 30 June 2011, 13973 women were enrolled in the DMP programme.
Results: After data cleansing, survival rates were calculated for a total of 11214 women. The 5-year overall survival (OS) rate was 86.3%; survival rates according to tumour stage on presentation were 92.2% (pT1) and 82.3% (pT2), respectively. The impact of steroid hormone receptor status on survival (87.8% for receptor-positive cancers vs. 78.9% for receptor-negative cancers) and of age at first diagnosis on survival (≤35 years = 91%) were calculated.
Conclusion: The project showed that intersectoral cooperation led to significant improvements in the quality of treatment over time, as measured by quality indicators and outcomes after treatment.

Zusammenfassung

Einleitung: Das Disease-Management-Projekt Mammakarzinom (DMP-Mammakarzinom) wurde 2004 in Hessen als gemeinsame Maßnahme zwischen den Krankenkassen in Hessen und dem Berufsverband der Frauenärzte e.V. zur Durchführung eines strukturierten Behandlungsprogramms für Brustkrebspatientinnen eingeführt. Hierbei erfolgt eine sektorenüberschreitende Zusammenarbeit zwischen den Koordinationskrankenhäusern, den Kooperationskliniken und den Frauenärzten, die sich in das DMP-Programm eingeschrieben haben.
Methodik: Die Analyse umfasst 13973 Datensätze der in das DMP-Programm eingeschriebenen Patientinnen vom 01.01.2005 bis zum 30.06.2011.
Ergebnisse: Nach Datenbereinigung konnten für 11214 Frauen Daten zum 5-Jahres-Überleben (86,3%) sowie zum Überleben nach Tumorgröße (pT1 = 92,2%, pT2 = 82,3%) errechnet werden. Ebenso wurde die Bedeutung des Steroidhormon-Rezeptorstatus (87,8% für rezeptorpositive Karzinome vs. 78,9% für rezeptornegative Karzinome) auf das Überleben und das Alter bei Erstdiagnose (≤35 Jahre = 91%) betrachtet.
Zusammenfassung: Das Projekt zeigt, dass die intersektorale Einrichtung und die Kooperation im Beobachtungszeitraum zu einer deutlichen Verbesserung der Behandlungsqualität, gemessen an den Qualitätsindikatoren, aber auch am Behandlungsergebnis beigetragen haben.

Introduction

The first published results of the DMP breast cancer programme in Hesse were discussed in an editorial entitled "DMP-Mamma – Ein Reizwort" [Buzzword: DMP Breast Cancer] published in April 2009. The first framework agreement for the DMP programme was concluded at the end of 2003. This marked the start of one of the most successful breast cancer quality assurance programmes in Germany. In 2012, the first five-year breast cancer survival rates were published, based on data obtained from the Gemeinsame Einrichtung (GE) in Hesse, the Hesse Breast

9 coordinating hospitals, 34 cooperating hospitals

1	31.07.2003	HSK, Dr. Horst Schmidt Hospital Wiesbaden + 1 cooperating hospital
2	31.07.2003	University Medical Centre Marburg + 6 cooperating hospitals
3	19.11.2003	University Medical Centre Gießen + 6 cooperating hospitals
4	04.12.2003	Clinical Centre Offenbach + 1 cooperating hospital
5	10.12.2003	Clinical Centre Hanau + 2 cooperating hospitals
6	12.03.2003	Clinical Centre Fulda
7	18.12.2003	University Medical Centre Frankfurt + 10 cooperating hospitals
8	24.12.2003	Clinical Centre Kassel + 1 cooperating hospital
9	24.02.2004	Clinical Centre Darmstadt + 7 cooperating hospitals

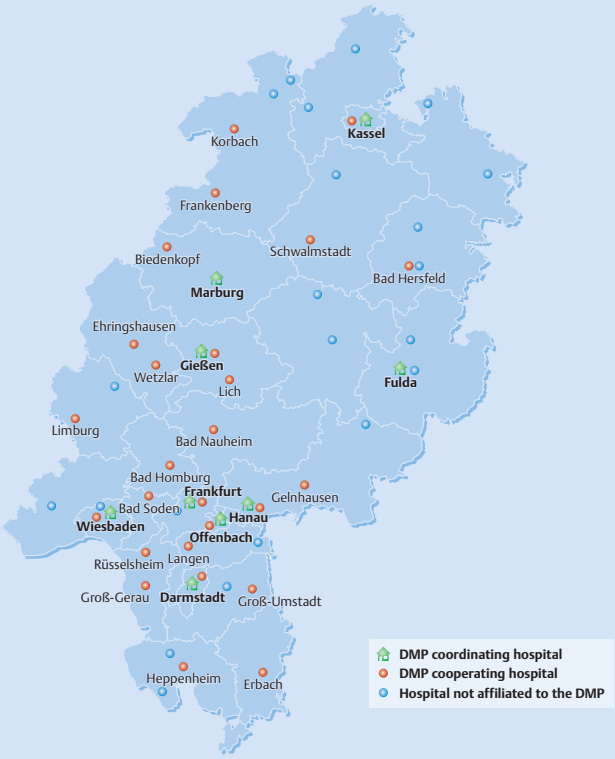

Fig. 1 Overview of breast centres of excellence in Hesse – DMP Breast Cancer Hesse – Breast Cancer Centres of Excellence (1 coordinating + cooperating hospital per centre).

Centres of Excellence, all DMP partners in Hesse and the results of the Agency for Quality Assurance (Geschäftsstelle für Qualitätssicherung, GQH).

History of the DMP Hesse

Prior to the start of the DMP programme in Hesse and the structured dialogue programme (Operative Gynäkologie Hessen [Surgical Gynaecology Hesse]) for quality assurance of the GQH, breast cancer treatment in Hesse varied greatly. Around 4000 cases underwent surgical treatment in one of Hesse's 80 hospitals every year. Facilities and equipment differed widely between hospitals. 70% of hospitals carried out fewer than 50 breast cancer operations per year. Only 8% of hospitals carried out at least 150 operations annually. These hospitals treated almost 39% of all new cases.

The structured treatment programme for breast cancer patients in Hesse was approved by the German Federal Social Insurance Authority (Bundesversicherungsamt) on January 1, 2004. A framework agreement was concluded directly with the Federations of German Health Insurance Funds (Verbände der Krankenkassen) and supported by the Professional Association of Gynaecologists (Berufsverband der Frauenärzte) without involvement of the Association of Statutory Health Insurance Physicians (Kassenärztliche Vereinigung). The first framework agreements were concluded on September 31, 2003 with the Dr. Horst Schmidt Hospital in Wiesbaden and the University Medical Centre in Marburg.

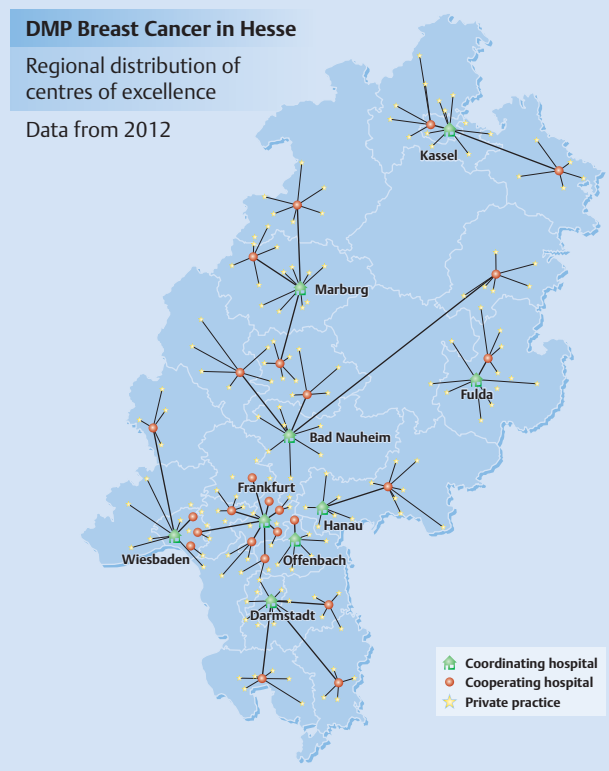

Fig. 2 Network of coordinating hospitals/cooperating hospitals.

		DMP hospitals			Non-DMP hospitals		
		2004	2005	2006	2004	2005	2006
		%	%	%	%	%	%
Preoperative histology	Target ≥90%	75.7	84.0	90.2	49.2	64.9	67.6
	Critical area <70%	(73.4; 77.9)	(82.3; 85.6)	(89.1; 91.5)	(41.7; 56.7)	(57.5; 68.7)	(60.5; 74.5)
Ratio of malignant to benign cases	Target ≥50%	63.0	69.7	70.3	56.3	59.4	60.3
	Critical area <50%	(60.1; 65.8)	(67.1; 72.2)	(67.7; 72.8)	(52.5; 59.9)	(55.7; 63.0)	(52.8; 64.1)
Postoperative specimen X-ray	Target ≥95%	80.5	88.1	94.9	66.7	73.5	71.2
	Critical area <75%	(75.5; 82.8)	(85.6; 89.9)	(93.0; 96.1)	(58.6; 74.5)	(64.5; 81.6)	(59.0; 81.8)
Analysis of hormone receptor status in invasive breast cancer	Target ≥95%	97.1	98.0	98.5	88.3	93.9	95.6
	Critical area <95%	(96.2; 97.6)	(97.4; 98.4)	(97.9; 98.8)	(84.6; 90.8)	(91.5; 95.8)	(93.3; 97.3)
Staging of invasive breast cancer	Target ≥95%	81.0	88.3	90.5	76.5	75.7	81.9
	Critical area <75%	(79.1; 82.8)	(86.9; 89.7)	(89.4; 91.7)	(70.6; 80.0)	(69.5; 79.2)	(76.8; 85.6)
Breast-conserving therapy in pT1 stage breast cancer	Target ≥70%	83.4	84.3	84.9	76.3	82.3	78.8
	Critical area <70%	(81.6; 85.4)	(82.6; 86.2)	(83.2; 86.7)	(68.9; 82.8)	(75.9; 88.1)	(71.1; 86.1)
Axillary dissection for carcinoma in situ	Target =0%	6.1	6.1	1.6	31.9	12.5	31.6
	Critical area >25%	(4.3; 8.6)	(4.2; 8.5)	(0.8; 3.0)	(20.4; 45.1)	(4.4; 26.6)	(14.7; 52.9)
Axillary dissection for invasive carcinoma	Target ≥95%	83.7	87.7	90.1	72.8	73.3	79.4
	Critical area <85%	(82.0; 85.3)	(86.3; 89.2)	(88.9; 91.3)	(66.3; 76.3)	(66.8; 77.0)	(73.7; 83.1)
Safety margins in breast-conserving surgery	Target ≥95%	77.6	88.1	93.8	71.6	72.8	82.9
	Critical area <80%	(75.4; 79.7)	(86.7; 89.6)	(91.8; 94.7)	(64.8; 78.1)	(66.3; 79.2)	(77.0; 87.9)
Safety margins in mastectomy procedures	Target ≥95%	64.7	79.0	90.2	56.0	58.3	55.4
	Critical area <80%	(61.8; 68.0)	(76.9; 81.4)	(87.3; 91.8)	(4.5; 64.0)	(49.8; 66.7)	(46.4; 64.6)
Breast cancer with secondary resection	Target n.r.	8.8	11.8	10.4	4.8	7.4	4.8
	Critical area n.r.	(7.6; 11.4)	(10.4; 13.2)	(9.1; 11.6)	(2.8; 7.5)	(4.9; 10.5)	(2.6; 8.1)
Surgical revision for complications	Target =0%	3.2	3.9	3.5	5.1	5.4	2.9
	Critical area >5%	(2.7; 4.3)	(3.3; 5.1)	(2.9; 4.6)	(3.6; 7.1)	(3.7; 7.6)	(1.7; 4.9)
Postoperative wound infections	Target ≤2,5%	1.7	1.7	1.8	3.8	2.6	1.3
	Critical area >5%	(1.4; 2.3)	(1.4; 2.3)	(1.5; 2.4)	(2.5; 5.5)	(1.5; 4.1)	(0.5; 2.8)
Adjuvant medical therapy for lymph node-positive breast cancer	Target ≥90%	94.3	95.0	96.4	90.5	89.6	88.2
	Critical area <90%	(84.5; 95.6)	(86.2; 96.0)	(89.8; 97.3)	(74.7; 94.5)	(72.5; 94.0)	(69.4; 93.3)
Adjuvant endocrine therapy for receptor-positive findings	Target ≥90%	95.5	96.4	96.3	85.7	86.5	83.2
	Critical area <90%	(94.1; 96.3)	(95.2; 97.0)	(95.1; 96.9)	(80.8; 88.9)	(81.9; 89.7)	(77.5; 88.0)
Adjuvant chemotherapy for receptor-negative findings	Target ≥90%	79.0	83.7	85.0	71.6	67.8	77.8
	Critical area <90%	(73.4; 82.2)	(79.0; 86.6)	(80.6; 87.9)	(61.9; 80.8)	(56.5; 78.5)	(63.2; 88.5)
Radiotherapy after breast-conserving therapy	Target ≥95%	89.8	92.8	94.3	68.0	77.5	80.9
	Critical area <80%	(86.8; 91.1)	(90.6; 93.9)	(92.5; 95.2)	(60.7; 75.1)	(71.5; 83.4)	(74.4; 86.4)
Radiotherapy after mastectomy	Target ≥40%	50.4	54.4	52.8	33.7	33.3	37.7
	Critical area <30%	(46.6; 54.1)	(51.3; 58.1)	(49.1; 56.6)	(25.8; 41.8)	(25.3; 42.4)	(28.7; 47.7)

Target achieved, statistically significant
Target achieved, statistically not significant
Value between target achieved and critical area
Critical area, statistically not significant
Critical area, statistically significant
n.r. = not reported

Fig. 3 Overview of GQH quality indicators for breast cancer 2004–2006.

Coordinating and cooperating hospitals – creating the perfect network

In this model, a hospital can conclude a framework agreement and is then responsible for coordinating activities in a regional breast centre of excellence. The agreement ensures that surgical standards and standards for adjuvant therapy are complied with, that more breast-conserving surgeries are carried out, and that patients are comprehensively followed up and given psychosocial support. Joint case conferences and at least two DMP training courses per year improve quality management (including optimising interfaces between facilities) and training. A network of interdisciplinary healthcare services and breast centres of excellence was developed. Coordinating hospitals were "high-volume" hospitals with more than 150 new cases treated annually. Coordinating and cooperating hospitals integrated in a centre of excellence had to show that each surgeon had previously carried out at least 50 breast cancer operations (**Fig. 1**). Breast centres of excellence also include DMP-accredited gynaecologists, who are primarily responsible for outpatient treatment and follow-up care (**Fig. 2**).

The Gemeinsame Einrichtung (GE), a body composed of equal numbers of representatives from hospitals in Hesse, representatives from the breast centres of excellence and from the Professional Association of Gynaecologists in Hesse, is responsible for quality assurance.

Common quality indicators were defined for all DMP hospitals. Comprehensive coverage through the creation of an intersectoral network and an annual anonymised evaluation assessing compliance with quality was achieved in Hesse [1], with GQH employees providing regular feedback of results to healthcare providers.

Current situation

The programme kicked off on January 1, 2004. Nine breast centres of excellence with 34 participating hospitals and more than 500 affiliated physicians in private practice were set up across the state of Hesse to offer comprehensive healthcare coverage. This created the basic structure with interdisciplinary on-

Indicators for processes			Hesse	DMP hospitals	Non-DMP hospitals
			%	%	%
Histological diagnosis ascertained prior to therapy	Target	n.d.	96.0	96.3	92.3
	Critical area	n.d.	(95.5; 96.5)	(95.8; 96.8)	(89.3; 94.6)
Histological diagnosis ascertained prior to therapy: palpable tumours	Target	≥90%	97.4	97.9	92.7
	Critical area	<90%	(96.8; 97.9)	(97.3; 98.3)	(89.5; 95.2)
Histological diagnosis ascertained prior to therapy: non-palpable tumours	Target	≥70%	93.6	93.7	89.7
	Critical area	<70%	(92.5; 94.6)	(92.6; 94.8)	(79.8; 95.8)
Intraoperative specimen X-ray	Target	≥95%	98.3	98,6	92.2
	Critical area	<95%	(97.6; 98.9)	(97.9; 99.1)	(82.6; 97.5)
Hormone receptor status analysis	Target	≥95%	99.7	99.7	99.3
	Critical area	<95%	(99.5; 99.8)	(99.5; 99.8)	(97.9; 99.9)
HER-2/neu status analysis	Target	≥95%	99.3	99.3	98.4
	Critical area	<95%	(99; 99.5)	(99.1; 99.6)	(96.6; 99.4)
Staging: pT and pN status	Target	≥95%	96.4	96.8	92.3
	Critical area	<75%	(95.9; 96.9)	(96.2; 97.3)	(89.2; 94.8)
Information on safety margins: for breast-conserving therapy	Target	≥95%	98.3	98.3	98.3
	Critical area	<95%	(97.9; 98.7)	(97.9; 98.7)	(95.7; 99.6)
Information on safety margins: for mastectomy	Target	≥95%	96.9	97.1	94.9
	Critical area	<95%	(95.9; 97.7)	(96.1; 98)	(90.2; 97.8)
Axillary dissection for DCIS	Target	≤5%	1.7	1.5	10.0
	Critical area	>5%	(0.8; 3.1)	(0.6; 3)	(0.2; 44.6)
Axillary dissection or sentinel lymph node biopsy for invasive carcinoma	Target	n.d.	96.4	96.7	93.6
	Critical area	n.d.	(96.9; 96.9)	(96.1; 97.2)	(90.6; 95.9)
Number of lymph nodes	Target	n.d.	92.5	94.1	75.0
	Critical area	n.d.	(90.9; 93.8)	(92.7; 95.4)	(66.1; 82.6)
Indication for sentinel lymph node biopsy	Target	≥76%	89.4	90.5	74.0
	Critical area	<76%	(88; 90.7)	(89; 91.8)	(65.5; 81.4)
Indication for breast-conserving therapy	Target	71–93.7%	83.6	83.8	81.1
			(82.2; 85)	(82.3; 85.2)	(74.3; 86.7)
Reported to Cancer Registry	Target	≥95%	99.2	99.2	98.7
	Critical area	<95%	(98.9; 99.4)	(98.9; 99.5)	(97; 99.6)
Time between diagnosis and surgery	Target	≥40.1%	59.1	60.0	49.0
	Critical area	<40.1%	(57.8; 60.4)	(58.6; 61.3)	(44.2; 53.8)
Indicators for results					
Postoperative wound infections	Critical area	n.d.	0.5	0.5	1.0
			(0.4; 0.7)	(0.3; 0.7)	(0.3; 2.3)

- **Target achieved, statistically significant**
- **Target achieved, statistically not significant**
- **Value between target achieved and critical area**
- **Critical area, statistically not significant**
- **Critical area, statistically significant**

n.d. = not defined

Fig. 4 Overview of GQH quality indicators for breast cancer 2010.

cological conferences and structured follow-up care provided by local affiliated gynaecologists. 564 gynaecologists out of a total 700 of gynaecological practices in Hesse joined the programme, ensuring that outpatient and follow-up care was available to every patient enrolled in the DMP programme (data from December 2012).

Just under 3500 patients were enrolled in the DMP programme in one year. Surgical quality assurance data were compared and analysed using data from non-DMP hospitals as a benchmark to evaluate whether the objectives of the DMP programme were being achieved.

The GQH report for the years 2004–2006 (initial registration) shows the improvements over time for the 18 quality indicators (**Fig. 3**). The data from 2010 show considerable changes (**Fig. 4**).

In the early years of 2004–2006, there were considerable differences between DMP hospitals and non-DMP hospitals with regard to achieving quality indicators. When the rates of breast-conserving surgeries for pT1 tumours were compared, the rates for non-DMP hospitals were around 10% lower. Since then, combined quality controls have greatly reduced this disparity. Fortunately, the quality indicators are distributed uniformly across all of the centres of excellence.

At the start of the DMP programme, preoperative knowledge of the definitive histology of invasive carcinomas was >70% in the centres of excellence, while the rate for this indicator in non-DMP hospitals was <30%. Today, the overall figures are >98% (for DMP hospitals) and 90.6% (for non-DMP hospitals).

Material and Method

In 2012, the Gemeinsame Einrichtung (GE) in Hesse working together with the Professional Assocation of Gynaecologists for the State of Hesse carried out the first analysis of survival data from the DMP programme in Hesse. The analysis for the period 1st January 2005–30th June 2011 included 13973 data sets of women enrolled in the DMP programme in Hesse. After methodical cleaning of pseudonymised data, datasets for 11214 women were available for analysis. The data was obtained from the initial

Basic data from DMP Breast Cancer Hesse

Original datasets:	13973
Cleansed by:	2759
Analysed datasets (N):	11214

Patient status (N = 11214)		
Alive	9725	86.7%
Died	932	8.3%
Lost to follow-up	557	5.0%

Tumour size (N' = 9520)		
pT1	5532	58.1%
pT2	3317	34.8%
pT3	407	4.3%
pT4	264	2.8%
n.s.	1694	15.1%

Age distribution (N' = 10657)		
<35	210	91.0%
36–49	2016	92.4%
50–69	5918	90.0%
70–79	1840	77.9%
>79	673	55.5%

Receptor status (N' = 11213)		
positive	9481	84.5%
negative	1732	15.4%
n.s.	1	

N' = evaluated data
n.s. = not specified

Fig. 5 Overview of basic data collected. n.s.: not specified.

records compiled by DMP hospitals. Data on tumour size (pT1-pT4) and hormone receptor status were additionally included in the analysis (**Fig. 5**).

The following treatment-relevant clinical endpoints were calculated:

- Total survival
- Total survival according to tumour stage at presentation
- Total survival according to hormone receptor status
- Total survival according to age distribution

Cox proportional hazards model and log-rank test were used for statistical analysis.

The high quality of the data is due to the fact that on 30th June 2011, the cut-off date of the survey, 86.7% of registered women were reported to be alive with only 8.3% reported to have died during survey period. 5% (557 women) were removed from the analysis as "lost to follow up".

Results

5-year survival rate

Survival was calculated in months from the date of the first manifestation of the primary tumour in the reference period. Five-year overall survival (OS) for the evaluated 11214 women calculated across all age groups and irrespective of tumour stage at diagnosis was 86.3% (**Fig. 6**).

5-year survival rate according to tumour stage

Tumour stage or size was not specified in 1694 cases, leaving a total of 9520 cases available for analysis. For the evaluation period, it could be shown that when tumour diameters were ≤ 2 cm (pT1), there was an excellent 5-year survival rate of 92.2%. Even for women with larger tumours (2–5 cm; pT2) the survival rate was still an impressive 82.3% (**Fig. 7**).

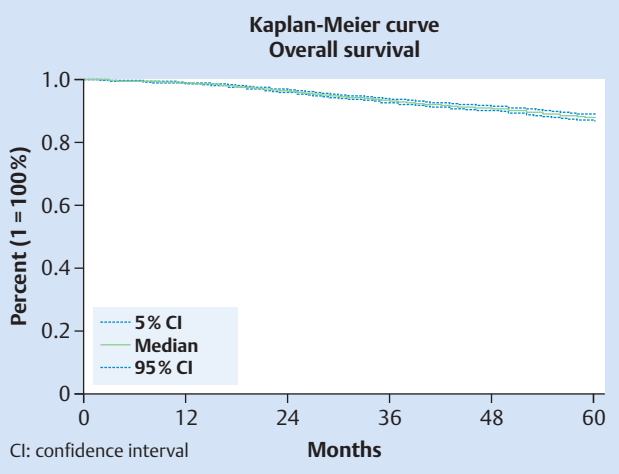

Fig. 6 Overall survival for all DMP patients whose data were available for analysis.

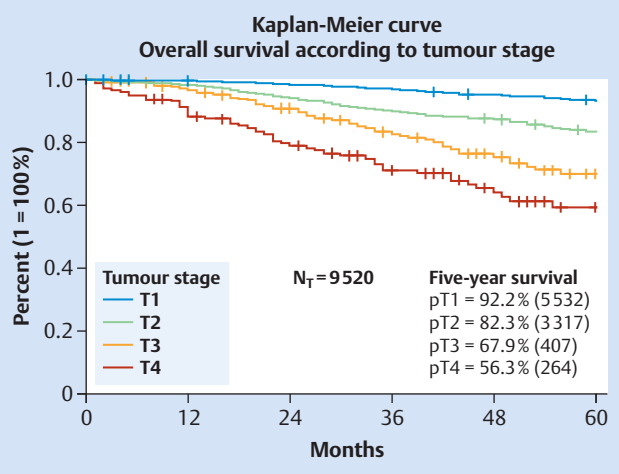

Fig. 7 Overall survival according to tumour stage.

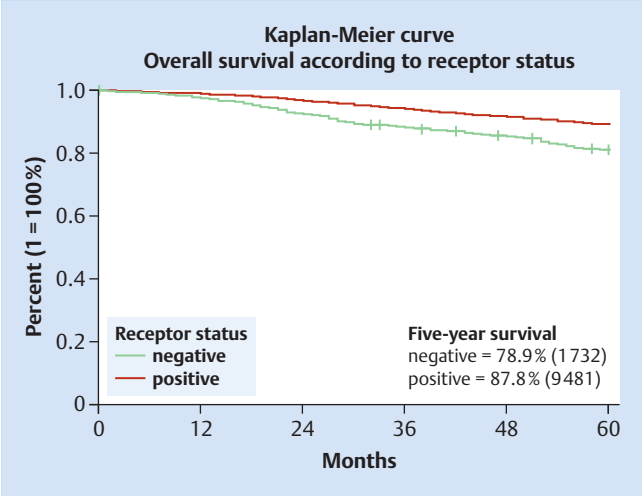

Fig. 8 Survival rate according to hormone receptor status.

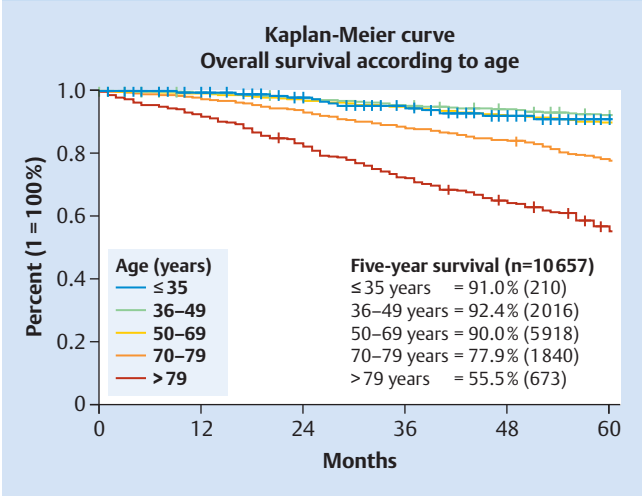

Fig. 9 Survival rate according to age at first diagnosis.

5-year survival rate according to hormone receptor status

Hormone receptor status (oestrogen and progesterone) is an important prognostic and predictive factor for anti-hormone treatment. The data of 11 213 women were available for analysis. The available data did not permit a differentiation between oestrogen receptor (ER) and progesterone receptor (PR) status. The analysis therefore only included the indicator "positive hormone receptor status". The 5-year survival rate for women with hormone receptor-positive breast cancer was 87.8 versus 78.9% for women with hormone receptor-negative tumours (**Fig. 8**). Analysis did not take into account whether patients underwent anti-hormone therapy.

5-year survival rate according to age at diagnosis

Although breast cancer is more common among older women, increasing numbers of younger women have also been diagnosed with this disease in the last few years. Younger age at diagnosis is an unfavourable prognostic factor. This makes the results presented here on survival rates according to age at diagnosis even more interesting. Rates were calculated based on the data of 10 657 women. The 5-year survival rate of 91% calculated for women ≤ 35 years was particularly noteworthy (**Fig. 9**).

Discussion

In an age of evidence-based medicine, comparatively little information is available on routine medical care available for oncological disease [2]. Particularly for breast cancer, the most common malignant disease affecting the female population with an incidence of almost 72 000 new cases every year, there are only limited reliable data. Only the Robert Koch Institute (RKI) with its current summary of epidemiological data for the years 2007/8 offers a good overview [3]. The current RKI review reports an absolute overall 5-year survival rate of 78.0% for 2007/8 [3]. This means that our figure of 86.3% for Hesse was significantly higher than the national average for Germany. A similarly good outcome with a 5-year survival rate of 87% can also be found in the Bavarian Cancer Registry for the period 2007/8 [9]. If we compare the 5-year survival rates for Hesse and Bavaria according to tumour stage (T1: 92 vs. 98%, T2: 82 vs. 86%, T3: 68 vs. 68%, T4 56 vs. 51%), then the data for Bavaria are better for early stages of disease, which may be due to early implementation of a mammography screening programme in Bavaria. When the 5-year survival rates are compared according to age group, the data paints a better picture for younger patients living in Hesse (≤ 35 years: 91 vs. 86%; 40–50 years: 89 vs. 92%). In contrast, the rates are more favourable in the Bavarian population for women older than 60 years of age [9].

The continued increase in the incidence of breast cancer in women has been variously ascribed to the adoption of an "urban lifestyle", possible in combination with a fundamental change in the reproductive behaviour of the female population. As mammography screening has become increasingly common and systemic adjuvant therapy – mainly the use of tamoxifen – has begun to have an impact, there has been a so-called "stage shift" of tumour stage at diagnosis, and mortality has dropped. This shift has been particularly noticeable in women with breast cancer and a positive oestrogen receptor status (ER pos.) and women younger than 70 years of age at the time of diagnosis. It would appear that oestrogen receptor-negative (ER neg.) breast cancers are more common at a younger age than ER-positive tumours. The incidence of ER-negative cancer first plateaus at around 50 years of age, and at around 70 years for ER-positive cancers. Loco-regional control has also improved as investigation of surgical specimens has improved and use of radiation therapy has become more common [4].

Analysis of parameters was deliberately limited to data collected for the classic prognostic factors (age, tumour size and hormone receptor status). No attempt was made to collect therapy-relevant data or other more modern prognostic factors as the expected heterogeneity of the data and the different documentation statuses would not have led to any meaningful results.

Treatment results were obtained from DMP Breast Cancer. This data is available for the first time for the German federal state of Hesse. Analysis of the period 2005–2011 provided excellent data on survival rates according to age group, tumour size and hormone receptor status; the data on smaller tumours and cancers in younger women up until the age of 36 must be among the best in Germany. Data of around 10 000 women was collected, providing a large volume of data for Hesse not previously available. This

data can now be used as a basis for a more detailed analysis of treatment results after breast cancer therapy and can be compared with comparative national and international studies. It could also be shown that intersectoral cooperation between the clinical sectors offering acute care and gynaecologists who provide diagnosis and follow-up outside the hospitals has improved the quality of outcomes. It is well known that the quality of treatment and care provided to women with breast cancer is positively correlated to structures, specialisation and experience. When this was measured using the numbers of patients receiving surgery after their first diagnosis for every hospital ("hospital" or "surgeons' volume"), data for the state of New York – which has a similarly heterogeneous population distribution and hospitals with a wide variability in cases with primary disease – clearly proved the connection between the number of patients with primary disease who underwent surgery and 5-year survival rates [5]. With regard to 5-year survival, Roohan et al. were able to show that hospitals with more than 150 primary cases every year had an advantage of 30% compared to hospitals which cared for fewer than 50 primary cases per year. This still applied for comorbidities and lymph node involvement after adjusted multivariate analysis [5].

Another positive side effect was that compliance with quality indicators also improved in non-DMP hospitals in Hesse. In one of the first analyses on the effect of the DMP project in Hesse, du Bois et al. were able to show already in 2004 that the quality of outcomes after treatment offered to breast cancer patients in Hesse varied greatly with regard to rates of breast-conserving surgeries. One of the original DMP criteria was a figure of at least 50 primary operations in every DMP hospital [6]. These structural conditions are also a basic requirement of guidelines-based systemic therapy [7, 8]. A lot has been achieved with the DMP in Hesse in the last few years; all parties participating in the intersectoral network must maintain this motivation when providing care to women with breast cancer in hospitals and in doctors' practices. Patients and their families and the general population without disease have a right to know where high-quality evidence-based medical care is available [10, 11]. Cooperations between different facilities to implement and improve quality indicators and guidelines are instruments which can be used to continually optimise therapy [12]. Certified breast centres have been established in Germany since many years as models which show how care can be optimised [13].

Appendix

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Coordinating hospitals in DMP Breast Cancer in Hesse

- Johann Wolfgang Goethe Universität Frankfurt, Klinik für Frauenheilkunde und Geburtshilfe, Theodor-Stern-Kai 7, 60590 Frankfurt am Main
- Universitätsklinikum Gießen und Marburg – Standort Marburg, Klinik für Gynäkologie, Gynäkologische Endokrinologie und Onkologie, Baldingerstraße, 35033 Marburg (Lahn)
- Dr.-Horst-Schmidt-Kliniken, Klinik für Gynäkologie und gynäkologische Onkologie, Ludwig-Erhard-Straße 100, 65199 Wiesbaden
- Klinikum Offenbach GmbH, Klinik für Gynäkologie und Geburtshilfe, Starkenburgring 66, 63069 Offenbach
- Klinikum Hanau, Frauenklinik, Leimenstraße 20, 63450 Hanau
- Interdisziplinäres Brustzentrum am Klinikum Kassel, Mönchebergstraße 41–43, 34125 Kassel
- Klinikum Fulda, Frauenklinik, Pacelliallee 4, 36043 Fulda
- Klinikum Darmstadt, Frauenklinik, Grafenstraße 9, 64283 Darmstadt
- Hochwaldkrankenhaus Bad Nauheim, Abteilung für Gynäkologie, Chaumont-Platz 1, 61231 Bad Nauheim

Cooperating hospitals in DMP Breast Cancer in Hesse

- St. Vincenz-Krankenhaus, Auf dem Schafsberg, 65549 Limburg
- Kreiskrankenhaus Eschwege, Elsa-Brandström-Straße 1, 37269 Eschwege
- Klinikum Wetzlar, Forsthausstraße 1, 35578 Wetzlar
- Asklepios Paulinen Klinik, Geisenheimerstraße 10, 65197 Wiesbaden
- Frauenklinik Erbach, Albert-Schweitzer-Straße 10, 64711 Erbach
- Kreiskrankenhaus Groß-Umstadt, Krankenhausstraße 11, 64823 Groß-Umstadt
- Katharina Kasper GmbH, Richard-Wagner-Straße 14, 60318 Frankfurt am Main
- Main-Kinzig-Kliniken, Herzbachweg 14, 63571 Gelnhausen
- St. Josefs Hospital, Solmsstraße 15, 65159 Wiesbaden
- Markus-Krankenhaus (FDK), Wilhelm-Epstein-Straße 2, 60431 Frankfurt am Main
- Kreiskrankenhaus Bergstraße, Viernheimer Straße 2, 64646 Heppenheim
- Asklepios Klinik Langen-Seligenstadt, Röntgenstraße 20, 63225 Langen
- Krankenhaus Nordwest, Steinbacher Hohl 2–26, 60488 Frankfurt am Main
- St. Josefs-Krankenhaus Gießen, Liebigstraße 24, 35394 Gießen
- Klinikum Bad Hersfeld, Seilerweg 29, 36251 Bad Hersfeld
- Deutsche Klinik für Diagnostik, Aukammallee 33, 65191 Wiesbaden
- Hochtaunus-Kliniken, Urselerstraße 33, 61348 Bad Homburg
- Kliniken des Main-Taunus-Kreises, Kronbergerstraße 36, 65812 Bad Soden
- Asklepios Klinik, Goethestraße 4, 35423 Lich
- Städtische Kliniken Höchst, Gotenstraße 6–8, 65929 Frankfurt am Main
- Elisabeth-Krankenhaus, Weinbergstraße 7, 34117 Kassel
- Herz-Jesu-Krankenhaus Fulda GmbH, Buttlarstraße 74, 36039 Fulda
- DRK-Krankenhaus, Hainstraße 77, 35216 Biedenkopf
- Ketteler Krankenhaus, Lichtenplattenweg 85, 63071 Offenbach
- Kreiskrankenhaus Frankenberg, Forststraße 9, 35066 Frankenberg

Conflict of Interest

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None.

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