Bispebjerg Hospital
Digestive Disease Center

UNIVERSITY OF COPENHAGEN

Enhancing generalist palliative care for patients with gastrointestinal cancer

The impact and future development of a palliative care case management intervention

Stine Gerhardt Hangstrup, RN, MSc, PhD

REGION

Agenda

1 | Introduction

2 | Background

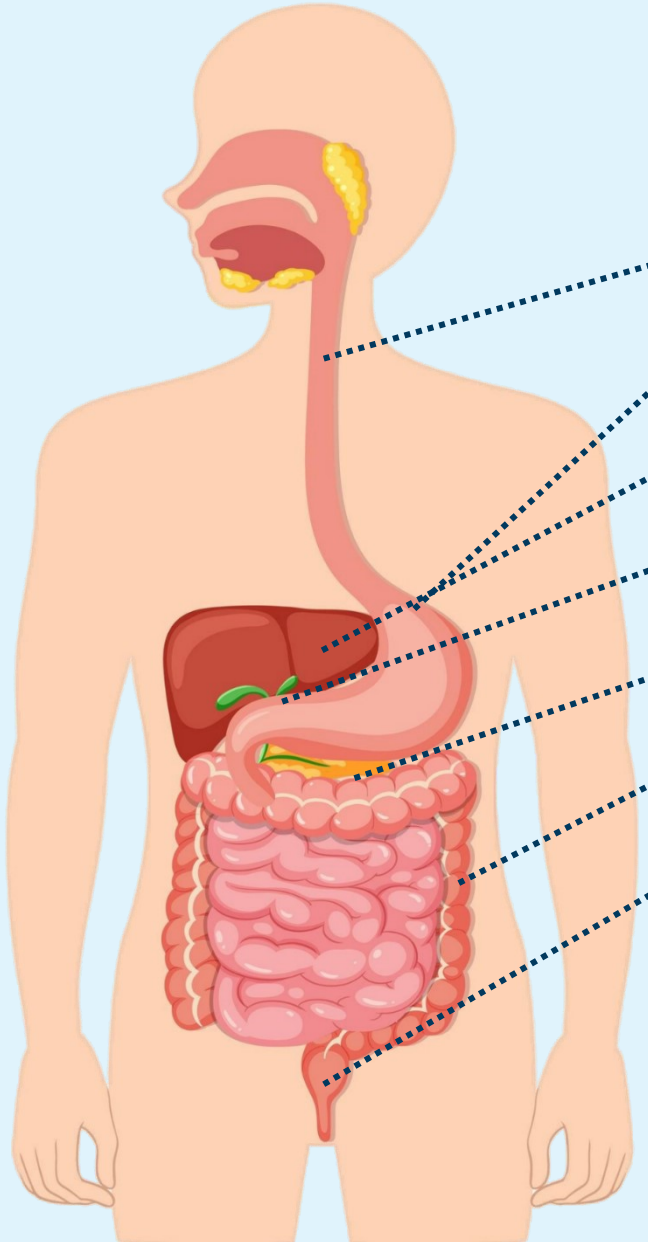
3 | Studies 1 2 3 4

4 | Conclusions

5 | Perspective

Gastrointestinal (GI) cancers

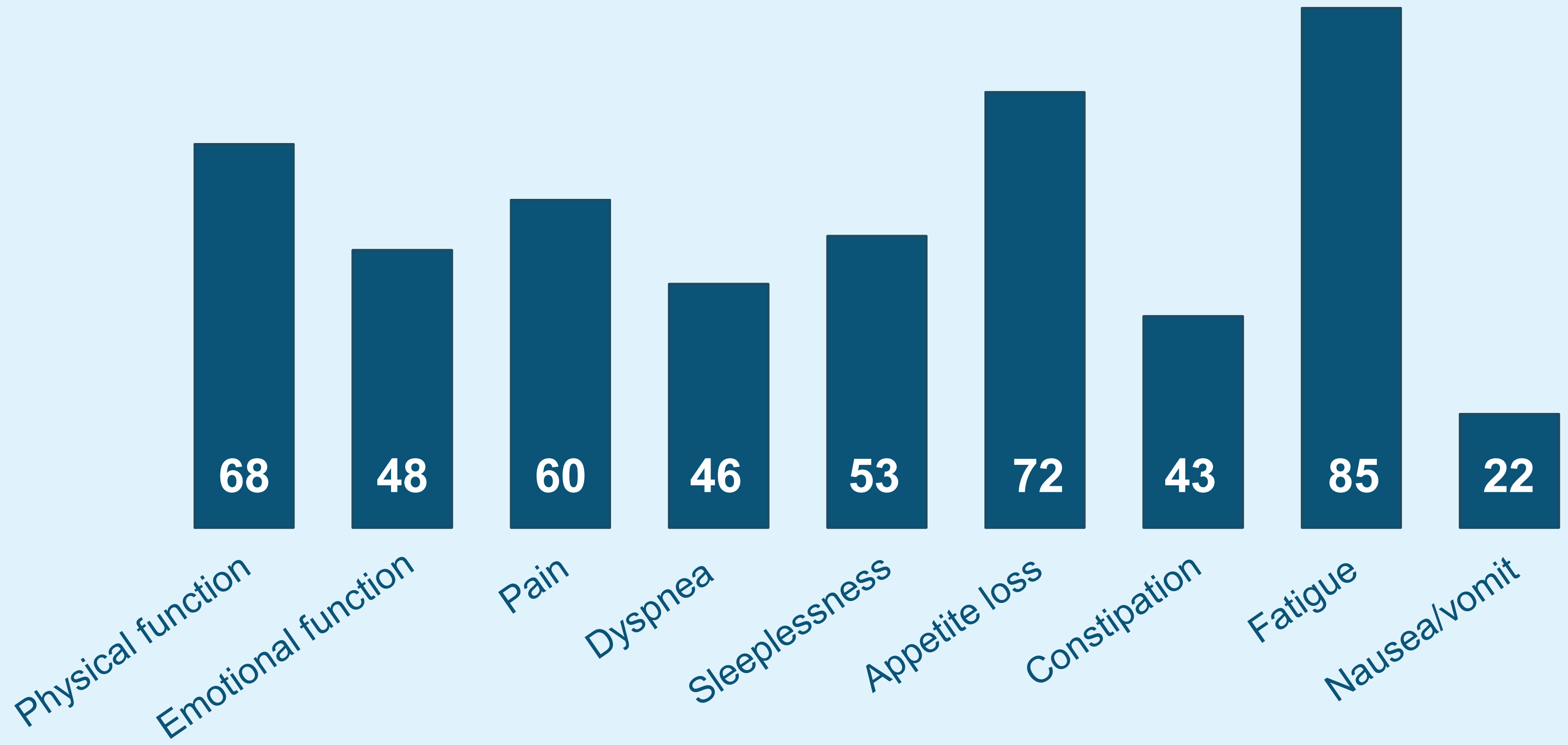
- **26%** of global cancer incidence
- **35%** of cancer-related deaths
- **4000** deaths in Denmark annually
- Poor prognosis

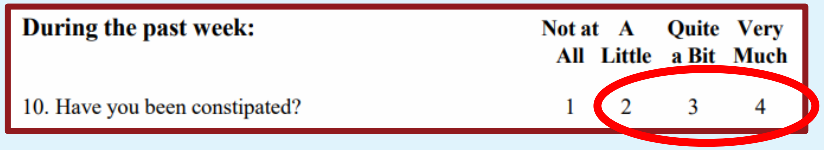


5-year survival rate

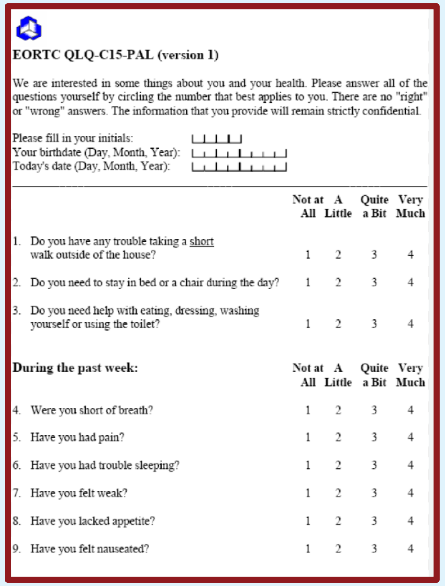
- Esophagus **5%**
- Stomach **7%**
- Liver **5%**
- Bile ducts **3%**
- Pancreas **3%**
- Colon **13%**
- Rectum **18%**

Baseline symptom burden (patients %) N=170





During the past week:	Not at All	A Little	Quite a Bit	Very Much
10. Have you been constipated?	1	2	3	4



EORTC QLQ-C15-PAL (version 1)

We are interested in some things about you and your health. Please answer all of the questions yourself by circling the number that best applies to you. There are no "right" or "wrong" answers. The information that you provide will remain strictly confidential.

Please fill in your initials:
Your birthdate (Day, Month, Year):
Today's date (Day, Month, Year):

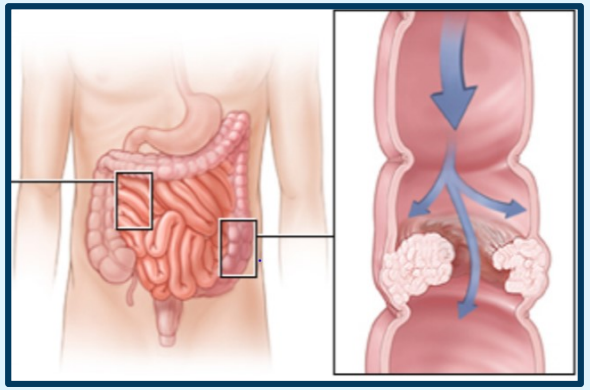
	Not at All	A Little	Quite a Bit	Very Much
1. Do you have any trouble taking a short walk outside of the house?	1	2	3	4
2. Do you need to stay in bed or a chair during the day?	1	2	3	4
3. Do you need help with eating, dressing, washing yourself or using the toilet?	1	2	3	4

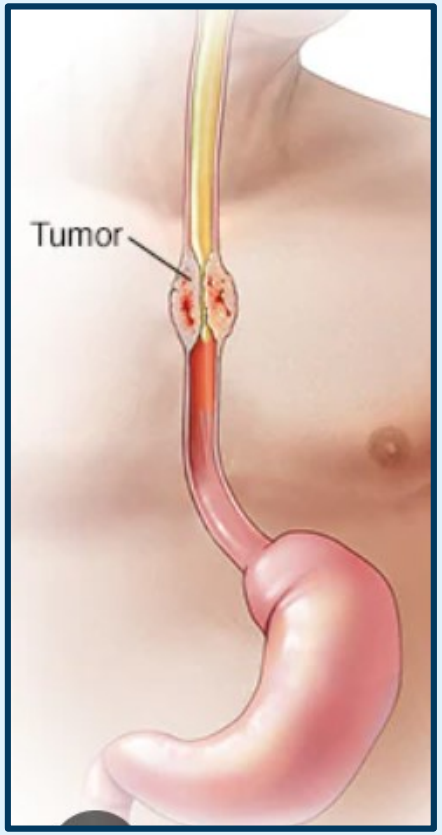
During the past week:	Not at All	A Little	Quite a Bit	Very Much
4. Were you short of breath?	1	2	3	4
5. Have you had pain?	1	2	3	4
6. Have you had trouble sleeping?	1	2	3	4
7. Have you felt weak?	1	2	3	4
8. Have you lacked appetite?	1	2	3	4
9. Have you felt nauseated?	1	2	3	4

REGION H

Symptoms associated with GI cancers

- Pain
- Fatigue
- **Malignant bowel obstruction**
- **Nausea**
- **Appetite loss**
- **Vomiting**
- **Diarrhea**
- **Constipation**





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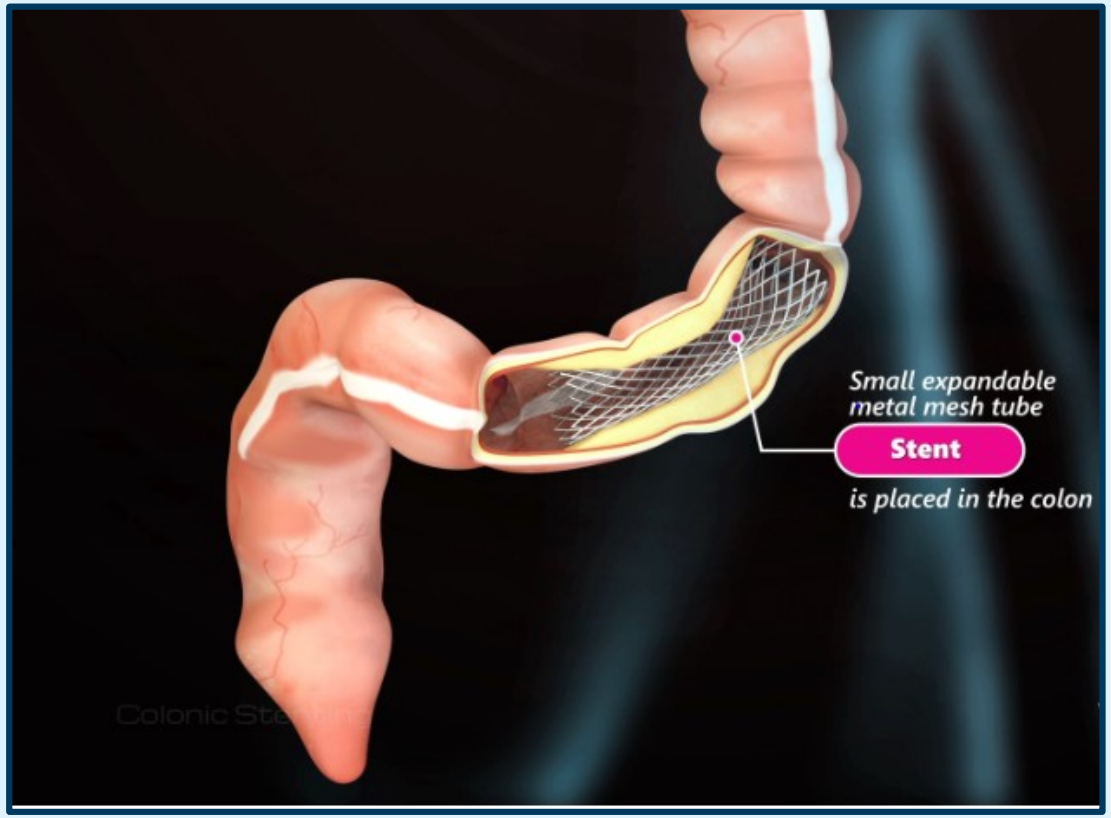
Symptom relief in surgical setting

Obstructive symtoms

→ Stents or stoma



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Generalist palliative care in hospital departments

- RCT [1] – cluster RCT [2 3 4]
- Nurse-led interventions
- Physical meetings [2], telephone consultations [2 3 4], follow-up at home [1]
- Symptom management[2 3 4], care coordination[2 3 4], ACP [2], psychosocial support[2]
- Outcomes: HQoL[1 2 4], anxiety [2], depression [2], satisfaction with care[1 4], hospital utilization [1]

NOT EFFECTIVE

REGION

1: Uitdehaag, et al.2014 the Nederlands, 2: Schenker et al. 2021 USA, 3: McCorkle et al.2015 USA, 4: Reinke et al. 2022 USA

Henvisningskriterier specialiseret palliativ indsats

- Orienteret om uhelbredelig sygdom
- Komplekse palliative behov

…som **ikke** kan håndteres i den basale palliative indsats

…vi **SKAL** prøve selv

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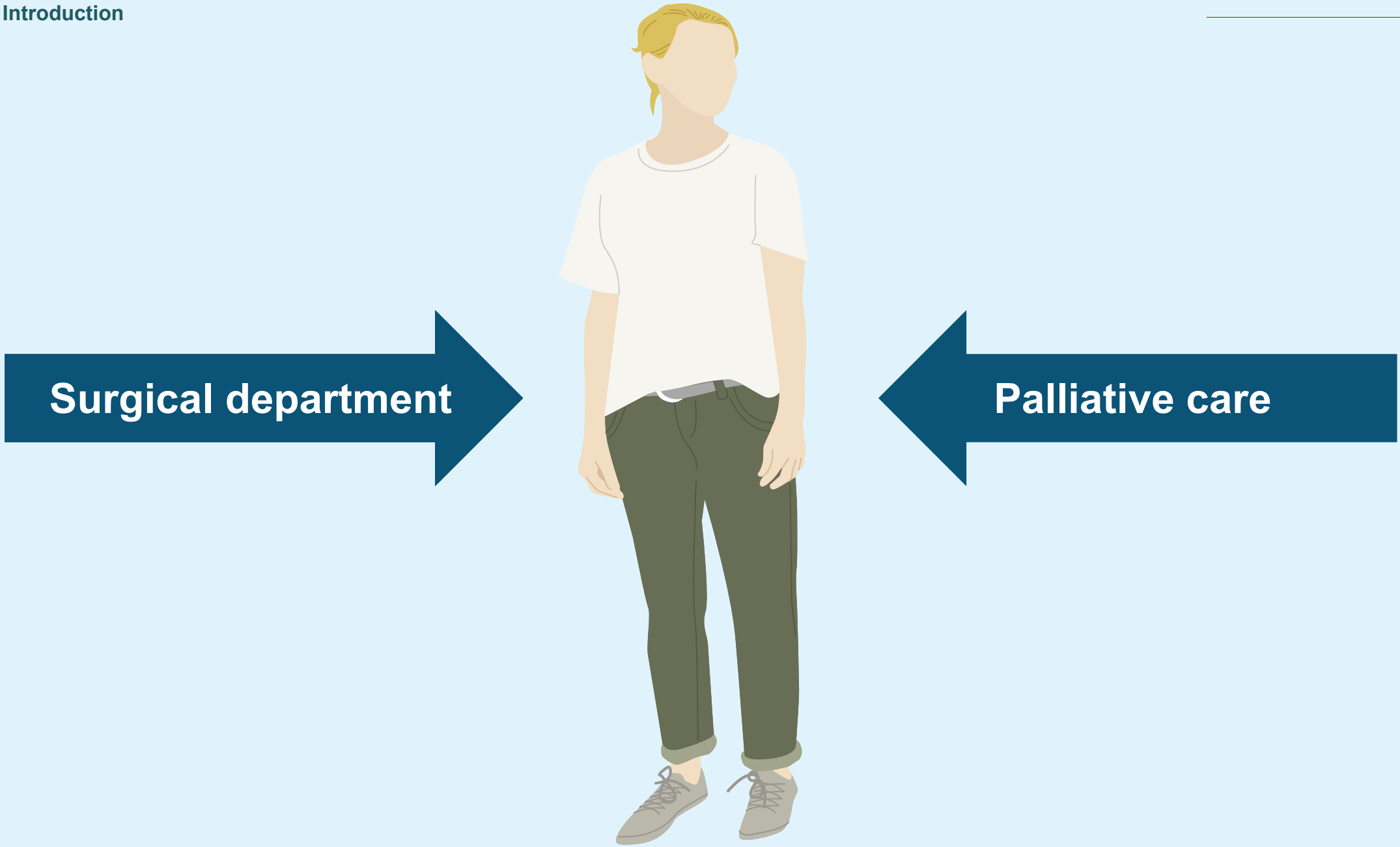

REGION

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Palliative case Management of Gastrointestinal Cancer

PalMaGiC

REGION

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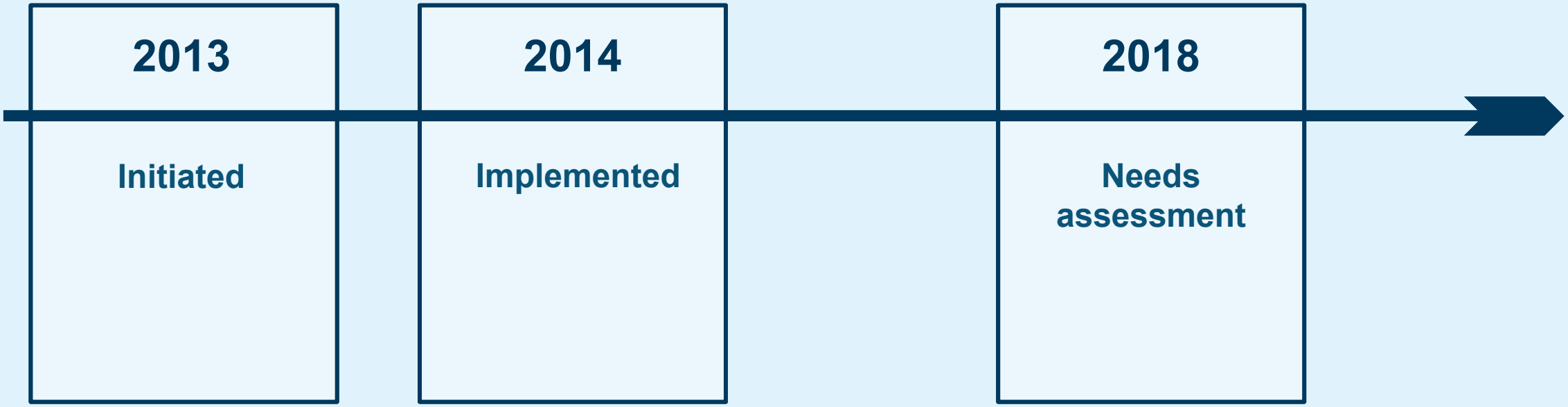
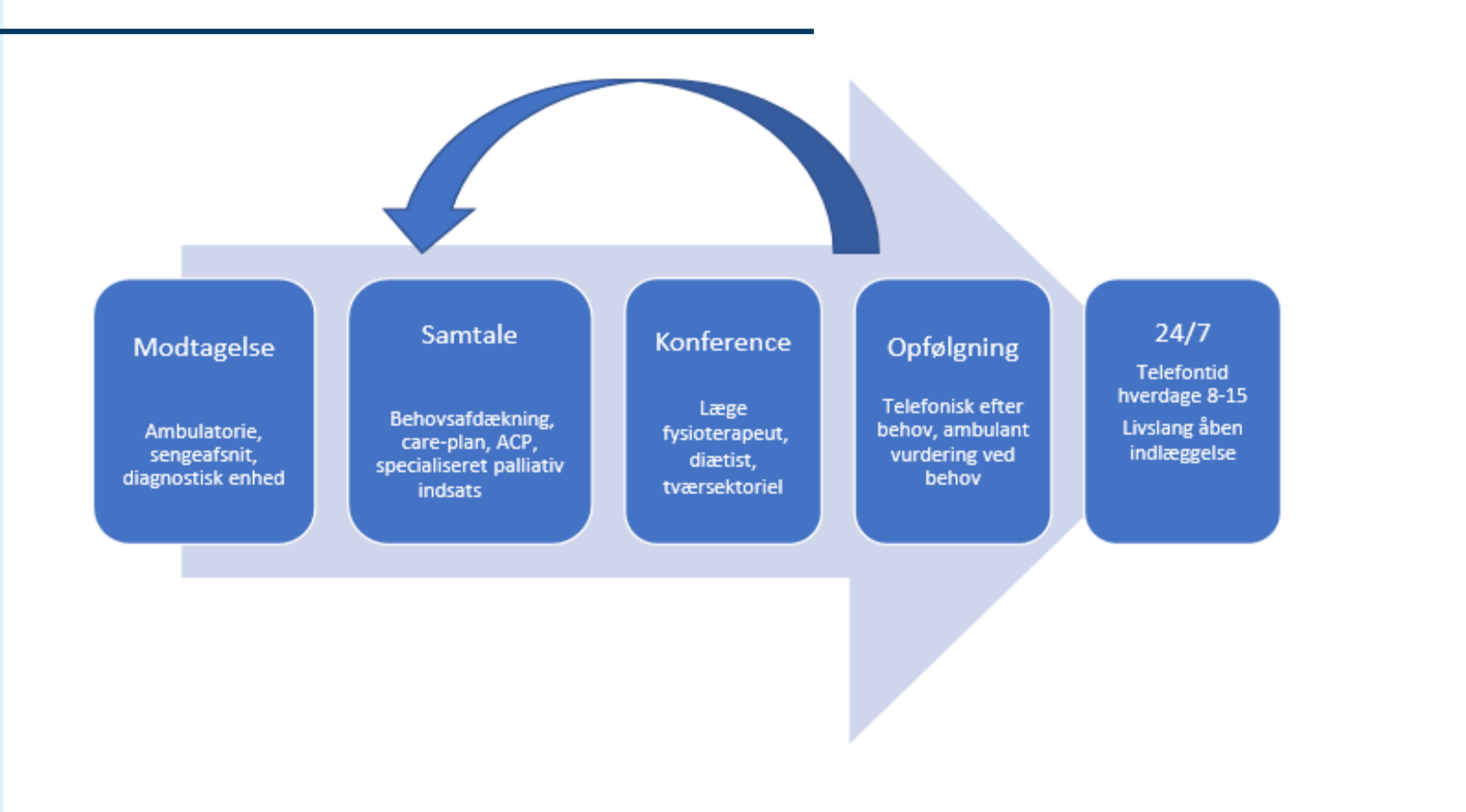
Palliative case Management of Gastrointestinal Cancer

PalMaGiC



REGION

Basalpalliation Abdominalcenter K - BBH



- Ca. 150 patienter/år

- Henvisning til specialiseret palliation ca. 60%

Background

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Quality of palliative care

- Symptom management
- Easy access
- Continuity
- Advance care planning
- Physical- and cognitive capacity
- Coordination
- Socializing
- Shared decision

Mccaffrey et al., Heyland DK et al.

REGION

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Quality of palliative care

Hospitalization

Health care use

Antineoplastic treatment

Death at hospital

Last 30 days of life

Last 14 days of life

REGION

Earle et al. “Identifying potential indicators of the quality of end-of-life cancer care from administrative data, 2003”

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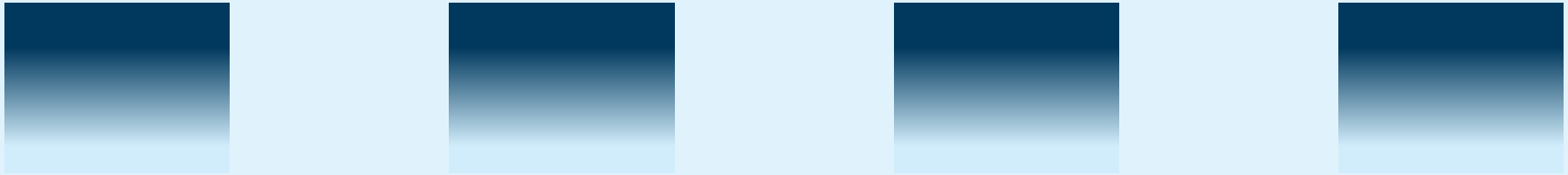
Quality of palliative care

Hospitalization | **Health care use** | **Antineoplastic treatment** | **Death at hospital**

AGGRESSIVE END-OF-LIFE CARE



Last 30 days of life | **Last 14 days of life**

REGION

Earle et al. “Identifying potential indicators of the quality of end-of-life cancer care from administrative data, 2003”

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Rationale of this thesis

- Does the PalMaGiC intervention deliver the intended quality of palliative care?
- Which patients risk developing complex palliative care needs and thus require specialized palliative care?

This knowledge will inform future development of generalist palliative care in hospital departments

REGION

Overview of studies

1	2	3	4
Qualitative evaluation of a palliative care case management intervention for patients with gastrointestinal cancer (PalMaGiC) in a hospital department	Associations between health-related quality of life and subsequent need for specialized palliative care and hospital utilization in patients with gastrointestinal cancer – A prospective cohort study	Palliative care case management in a surgical department for patients with gastrointestinal cancer – A register-based cohort study	Aggressive end-of-life care during the last 30 days of life – A nationwide study of patients with gastrointestinal cancer
Gerhardt, S. Herling, S et al. *European Journal of Oncology Nursing 2018*	**Gerhardt, S. Krarup, P-M. et al.** *Supportive Care in Cancer 2024*	**Gerhardt, S. Krarup, P-M. et al.** *Supportive Care in Cancer 2024*	**Gerhardt, S. Krarup, P-M. et al.** *Under review in Acta Oncologica 2024*

Contents lists available at ScienceDirect

European Journal of Oncology Nursing

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

Check for updates

Qualitative evaluation of a palliative care case management intervention for patients with incurable gastrointestinal cancer (PalMaGiC) in a hospital department

Stine Gerhardt [a,*], Bonna Leerhøy [a,b], Lene Jarlbaek [c], Suzanne Herling [d]

[a] Digestive Disease Center, Copenhagen University Hospital - Bispebjerg, Bispebjerg Bakke 23, 2400, Copenhagen, NV, Denmark
[b] Center for Translational Research, Copenhagen University Hospital - Bispebjerg, Nielsine Nielsensvej 4, 2400, Copenhagen, NV, Denmark
[c] Danish Knowledge Centre for Rehabilitation and Palliative Care (REHPA), University of Southern Denmark, Vestergade 17, 5800, Nyborg, Denmark
[d] The Neuroscience Center, Copenhagen University Hospital – Rigshospitalet, Blegdamsvej 9, 2100, København Ø, Copenhagen, Denmark

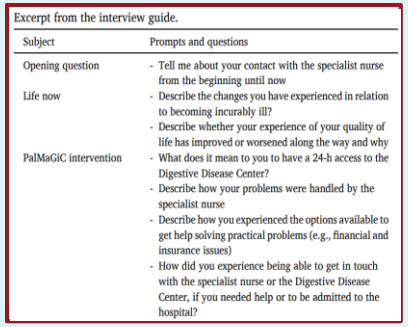
Aim

To explore the patient's experience of a palliative care case management intervention (PalMaGiC), acquire knowledge about its advantages and disadvantages, and, if needed, adjust the intervention

Methods

Qualitative exploratory study

Patients in PalMaGiC N=14



Excerpt from the interview guide.

Subject	Prompts and questions
Opening question	- Tell me about your contact with the specialist nurse from the beginning until now
Life now	- Describe the changes you have experienced in relation to becoming incurably ill? - Describe whether your experience of your quality of life has improved or worsened along the way and why
PalMaGiC intervention	- What does it mean to you to have a 24-h access to the Digestive Disease Center? - Describe how your problems were handled by the specialist nurse - Describe how you experienced the options available to get help solving practical problems (e.g., financial and insurance issues) - How did you experience being able to get in touch with the specialist nurse or the Digestive Disease Center, if you needed help or to be admitted to the hospital?

Content analysis

Results

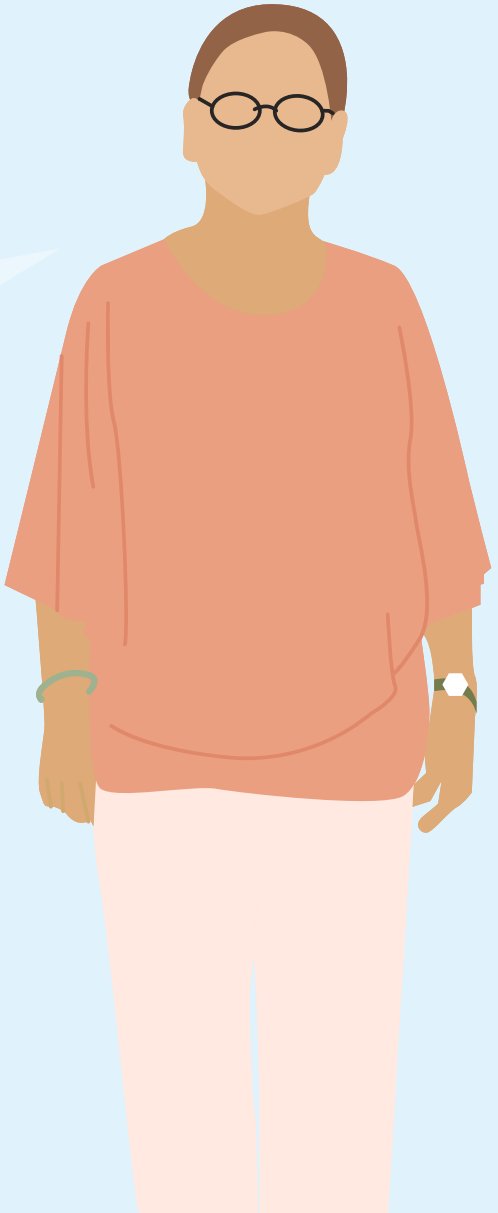
Overarching theme

Filling in the gap and being the lifeline in the healthcare system to increase quality of life

- Cover limitations in the healthcare system
- A lifeline to navigate
- Easy access

Results

”To have a lifeline or to experience that you have a lifeline and that it is accessible. It’s not just calling some number between 1 and 4 on Wednesdays, or something like that. That’s no use. If you have a problem that you would like solved then it’s good to have someone to call directly”



Results

Category 4

Areas of improvement

- Increased attention to complementary and alternative medicine
- Needs assessment questionnaires impersonal and annoying

Overview of studies

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Supportive Care in Cancer (2024) 32:311
https://doi.org/10.1007/s00520-024-08509-z

RESEARCH

Check for updates

Associations between health-related quality of life and subsequent need for specialized palliative care and hospital utilization in patients with gastrointestinal cancer—a prospective single-center cohort study

Stine Gerhardt[1] · Kirstine Skov Benthien[2,3] · Suzanne Herling[5] · Bonna Leerhøy[1,4] · Lene Jarlbaek[3] · Peter-Martin Krarup[1]

Received: 6 December 2023 / Accepted: 15 April 2024

Aim

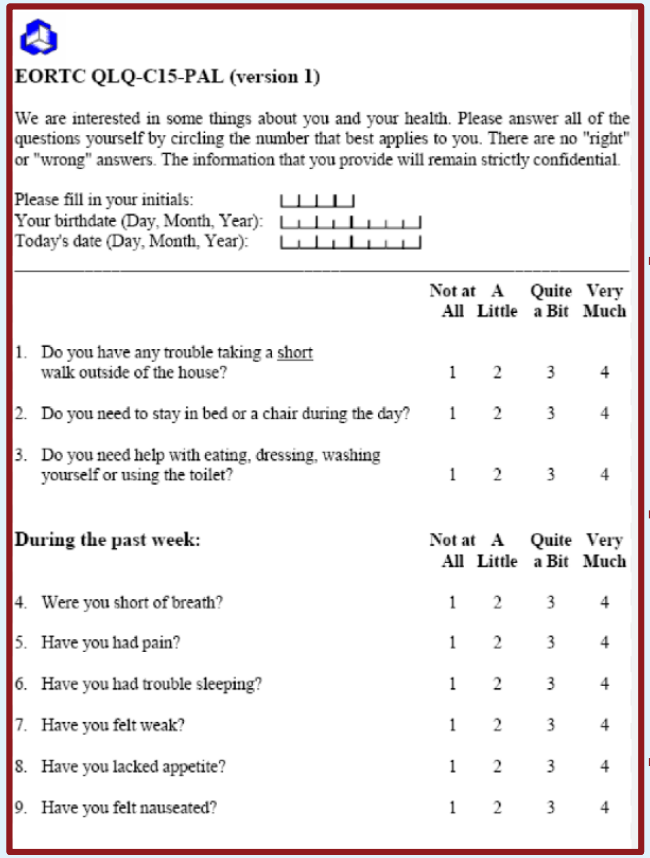
To investigate the associations between patient-reported HRQoL and subsequent
1) referral to specialized palliative care
2) hospital utilization

Methods

Prospective cohort study

Patients with GI cancer N=397

Included N=170



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Please fill in your initials: ⌊_⌋⌊_⌋⌊_⌋⌊_⌋
Your birthdate (Day, Month, Year): ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
Today's date (Day, Month, Year): ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋

	Not at All	A Little	Quite a Bit	Very Much
1. Do you have any trouble taking a short walk outside of the house?	1	2	3	4
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7. Have you felt weak?	1	2	3	4
8. Have you lacked appetite?	1	2	3	4
9. Have you felt nauseated?	1	2	3	4

Specialized palliative care

Hospital admissions

Length of stay

Age, sex, cancer site, comorbidity, education

REGION

Inclusion

Patients with incurable gastrointestinal cancer
Digestive Disease Center, December 2018 to May 2022
N = 397

Excluded
- Patient decline = 34
- Immediate affiliation with SPC = 47
- Cognitive inability or functional deterioration = 90
- Not speaking Danish = 17
- Logistics = 39

N = 227

Included
N = 170

Results

Table 1 Baseline characteristics for included and excluded patients in the study cohort

N = 397	Included *n* = 170	Excluded *n* = 227	*P* value*
Age, median (IQR)	74 (66–81)	78 (67–86)	0.004
Sex, *n* (%)			
Male	93 (55%)	124 (55%)	1.000
Days from incurable cancer diagnosis to baseline, median (IQR)	9 (3–29)	14.5 (4–87)	0.021
Days of follow-up time, median (IQR)	69 (28–199)	42 (17–137)	0.002
Days from baseline to death, median (IQR)	85 (41–210)	70 (24–189)	0.042
Cancer site, *n* (%)			0.565
Esophagus, cardia, stomach (ECS)	32 (19%)	48 (21%)	
Pancreas	50 (29%)	51 (22%)	
Bile ducts	17 (10%)	23 (10%)	
Colon/rectum	62 (36%)	88 (39%)	
Other	9 (5%)	17 (8%)	
Charlson Comorbidity Index, *n* (%)			0.106
0	105 (62%)	116 (51%)	
1	51 (30%)	83 (37%)	
2+	14 (8%)	27 (12%)	
Disease, *n* (%)			0.035
Locally advanced	41 (24%)	77 (34%)	
Metastases	129 (76%)	150 (66%)	
Antineoplastic treatment, *n* (%)			
Chemotherapy	78 (46%)	74 (33%)	0.009
Radiation	31 (18%)	38 (17%)	0.893
Immunotherapy	8 (5%)	7 (3%)	0.595
Education, *n* (%)			
Master's level or above	34 (20%)	-	-
Primary-bachelor's level	136 (80%)	-	-
Cohabitation status, *n* (%)			0.011
Living alone	86 (51%)	149 (66%)	
Living with spouse/partner	72 (42%)	67 (30%)	
Other	12 (7%)	11 (4%)	

**P* value for performed Wilcoxon rank sum test and chi-squared test for comparison of included vs excluded patients. Charlson Comorbidity Index scores of 0 = normal, 1 = moderate, ≥ 2 = severe

Included vs excluded patients

N = 227

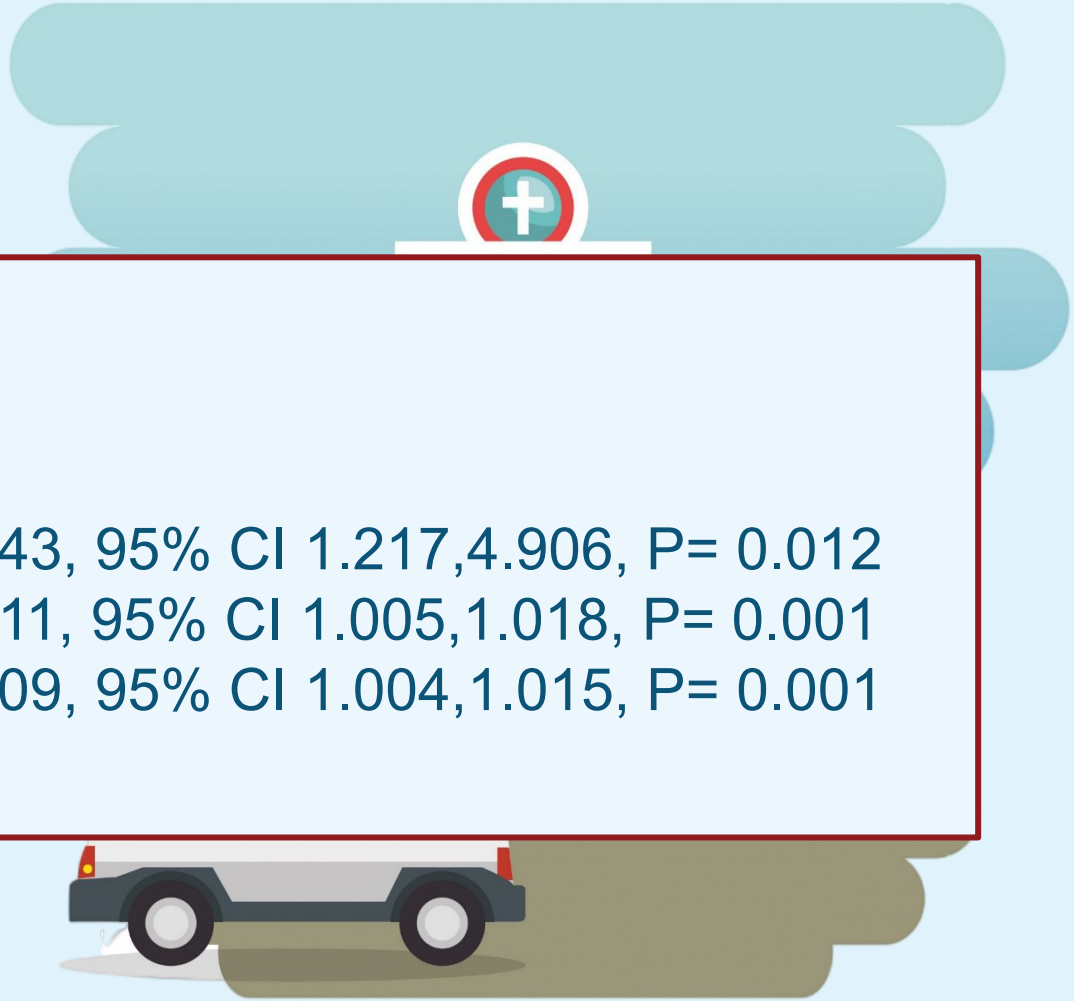
- Older
- Shorter survival time (from first contact)
- More had chemotherapy
- More were living alone
- Less patients referred to SPC

Results –

Table 2 Factors associated with subsequent need for specialized palliative care

$N=170$	Crude			Adjusted		
Referral to specialized palliative care	OR	95% CI	*P* value	OR	95% CI	*P* value
Age						
≤70	1.534	0.733–3.211	0.256	1.228	0.508–2.969	0.648
Sex						
Male	0.508	0.249–1.036	0.062	1.853	0.796–4.311	0.156
Diagnosis group						
Colorectal	Ref	Ref	Ref	Ref	Ref	Ref
ECS	0.557	0.217–1.428	0.502	0.781	0.263–2.322	0.968
Pancreatic	0.924	0.383–2.228	0.423	0.912	0.333–2.500	0.656
Bile duct	0.948	0.266–3.372	0.552	1.049	0.196–5.615	0.636
Other	0.364	0.086–1.543	0.237	0.357	0.065–1.948	0.253
Education						
Master's level or above	Ref	Ref	Ref	Ref	Ref	Ref
Primary-bachelor's level	**0.309**	**0.102–0.933**	**0.037**	**0.210**	**0.056–0.778**	**0.037**
Charlson Comorbidity Index						
0	Ref	Ref	Ref	Ref	Ref	Ref
1	0.775	0.353–1.700	0.056	1.073	0.424–2.715	0.069
2+	**0.106**	**0.030–0.371**	**0.007**	**0.173**	**0.041–0.733**	**0.012**
Disease						
Metastases	Ref	Ref	Ref	Ref	Ref	Ref
Locally advanced	**0.252**	**0.119–0.535**	**<0.001**	**0.279**	**0.111–0.696**	**0.063**
Symptoms						
Physical function	0.998	0.986–1.011	0.811	0.999	0.982–1.017	0.936
Emotional function	1.000	0.987–1.013	0.948	1.004	0.986–1.023	0.650
Nausea	1.005	0.992–1.018	0.465	0.996	0.979–1.014	0.674
Pain	**1.013**	**1.002–1.024**	**0.017**	**1.015**	**1.001–1.029**	**0.039**
Fatigue	1.010	0.999–1.022	0.077	1.012	0.992–1.031	0.233
Dyspnea	1.003	0.992–1.014	0.567	1.003	0.989–1.018	0.665
Sleeplessness	0.999	0.990–1.008	0.822	0.998	0.987–1.010	0.772
Appetite loss	1.006	0.998–1.015	0.149	1.002	0.990–1.014	0.733
Constipation	1.004	0.994–1.014	0.420	0.998	0.984–1.011	0.711
Overall QoL	0.998	0.985–1.011	0.716	1.005	0.998–1.023	0.570

Results - Hospital admissions



Admissions, median (IQR)	**2 (1-2)**
Bile duct cancer	IRR= 2.443, 95% CI 1.217,4.906, P= 0.012
Pain	IRR= 1.011, 95% CI 1.005,1.018, P= 0.001
Constipation	IRR= 1.009, 95% CI 1.004,1.015, P= 0.001

Overview of studies

1

Qualitative evaluation of a palliative care case management intervention for patients with gastrointestinal cancer (PalMaGiC) in a hospital department

Gerhardt, S. Herling, S et al.
European Journal of Oncology Nursing 2018

2

Associations between health-related quality of life and subsequent need for specialized palliative care and hospital utilization in patients with gastrointestinal cancer – A prospective cohort study

Gerhardt, S. Krarup, P-M. et al.
Supportive Care in Cancer 2024

3

Palliative care case management in a surgical department for patients with gastrointestinal cancer – A register-based cohort study

Gerhardt, S. Krarup, P-M. et al.
Supportive Care in Cancer 2024

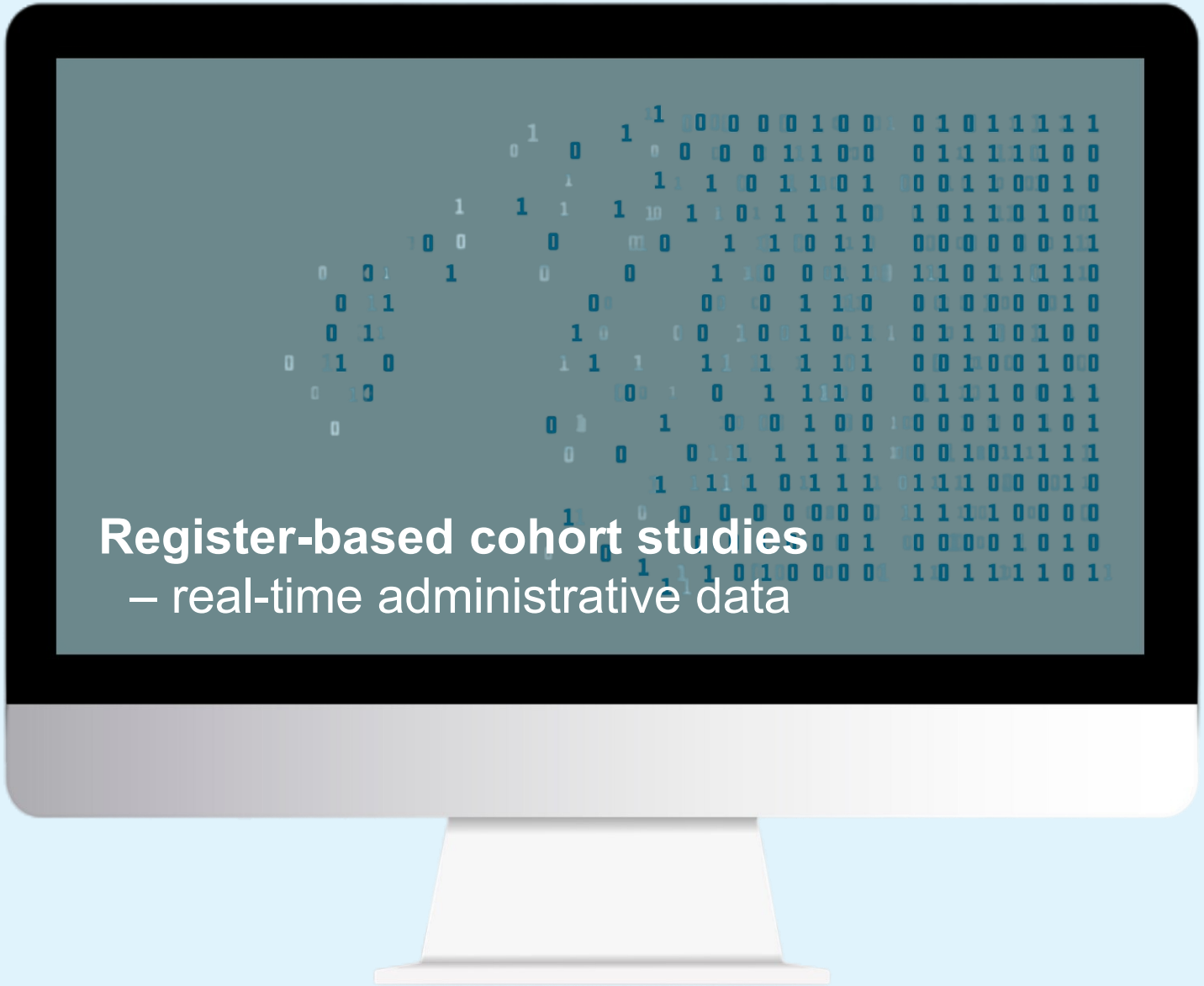
4

Aggressive end-of-life care during the last 30 days of life – A nationwide study of patients with gastrointestinal cancer

Gerhardt, S. Krarup, P-M. et al.
Under review in Acta Oncologica 2024

Methods

Design



Bispebjerg Hospital
Digestive Disease Center

Studies 1 2 3 4

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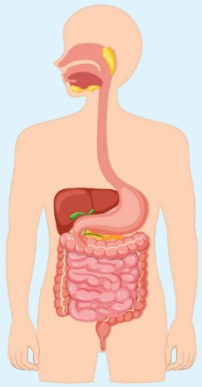
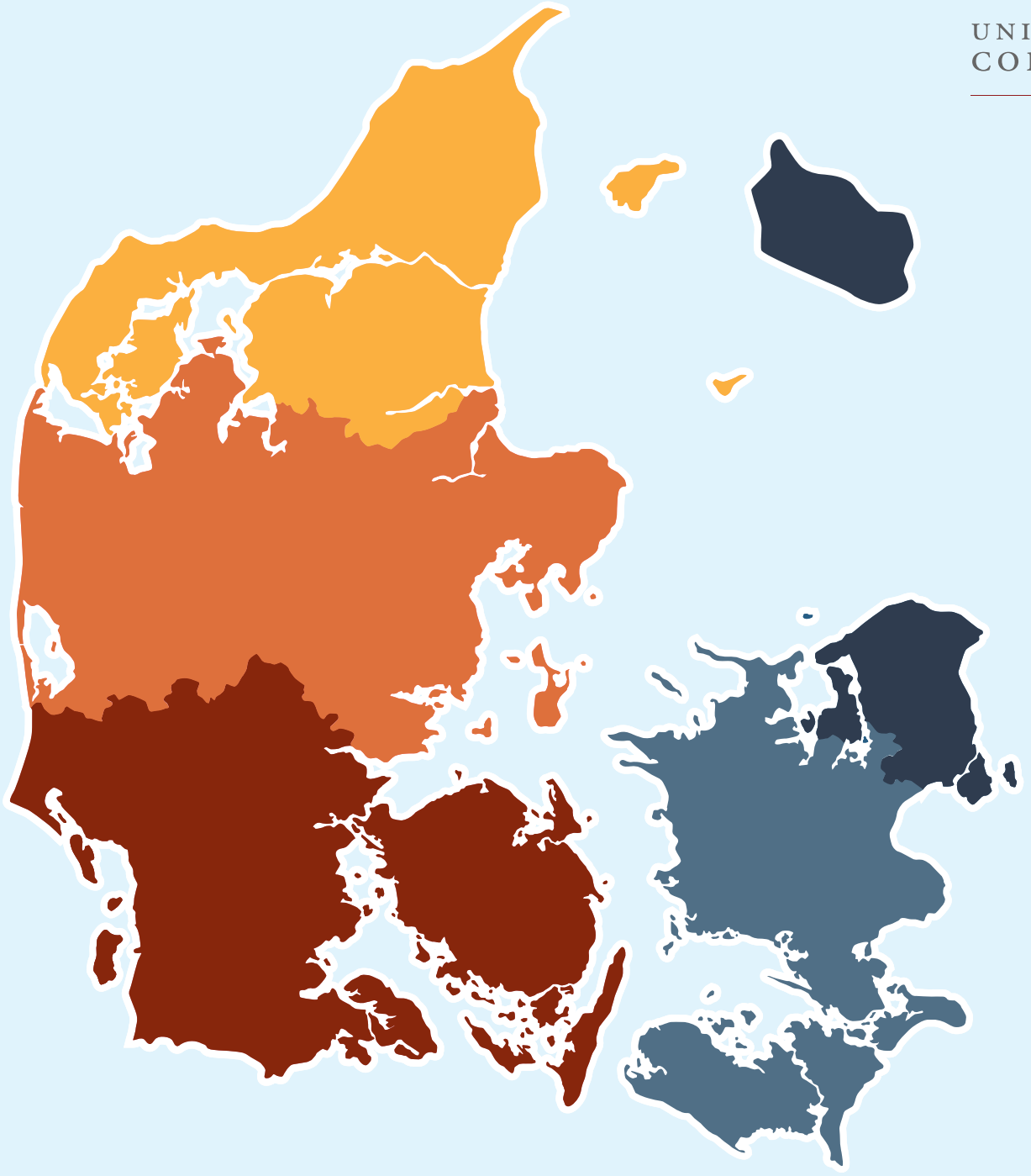
Cohort

2010 – 2020

N=43.969





REGION

Data sources

Overview of studies

1	2	3	4
Qualitative evaluation of a palliative care case management intervention for patients with gastrointestinal cancer (PalMaGiC) in a hospital department	Associations between health-related quality of life and subsequent need for specialized palliative care and hospital utilization in patients with gastrointestinal cancer – A prospective cohort study	Palliative care case management in a surgical department for patients with gastrointestinal cancer – A register-based cohort study	Aggressive end-of-life care during the last 30 days of life – A nationwide study of patients with gastrointestinal cancer
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Supportive Care in Cancer (2024) 32:592
https://doi.org/10.1007/s00520-024-08794-8

RESEARCH

Check for updates

Palliative care case management in a surgical department for patients with gastrointestinal cancer—a register-based cohort study

Stine Gerhardt[1] · Kirstine Skov Benthien[2,3,4] · Suzanne Herling[5] · Marie Villumsen[6] · Peter-Martin Krarup[1]

Aim

To explore the impact of a palliative care case management intervention for gastrointestinal cancers on hospitalizations, healthcare use, and place of death

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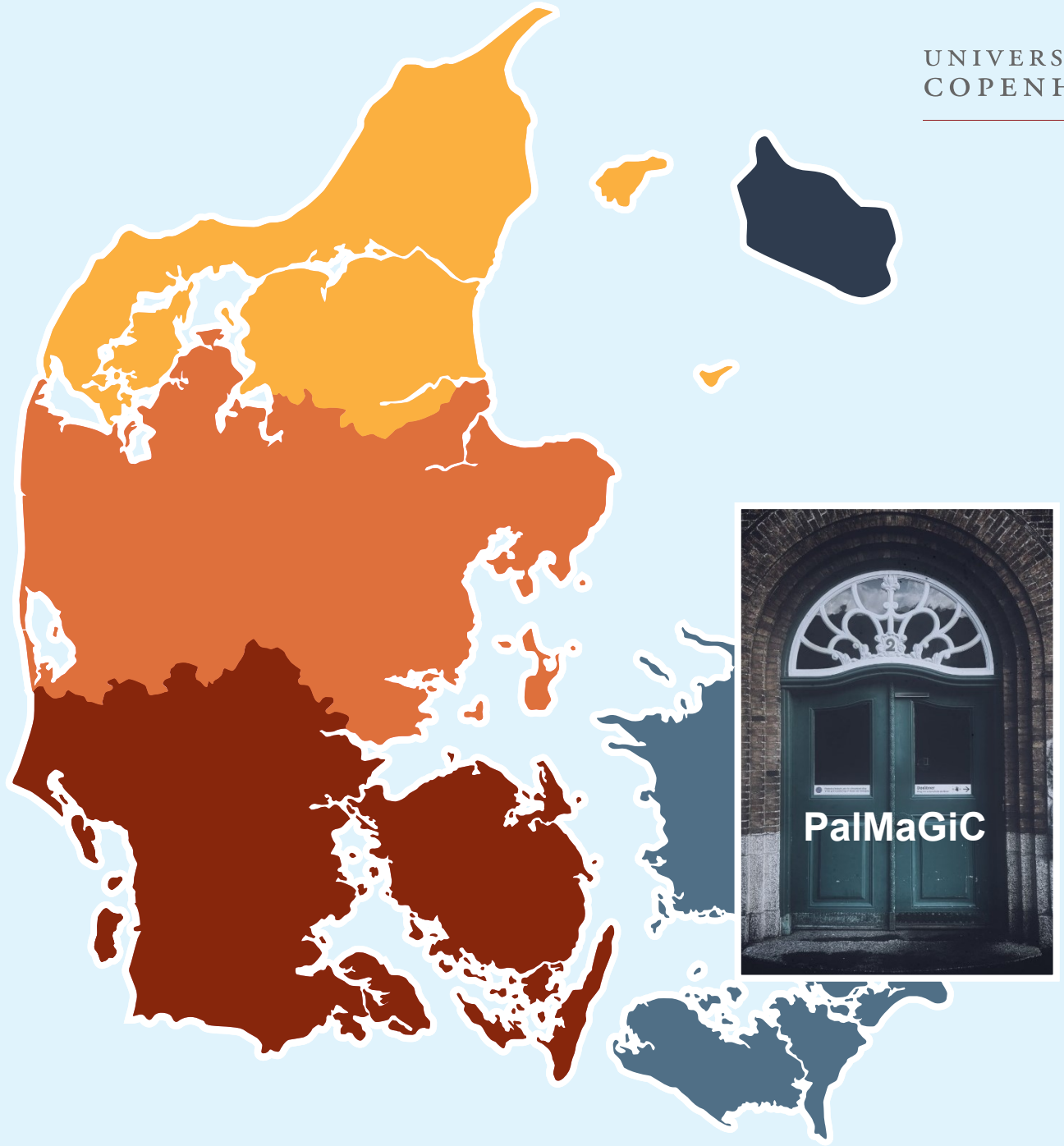
Exposure

N=43.969

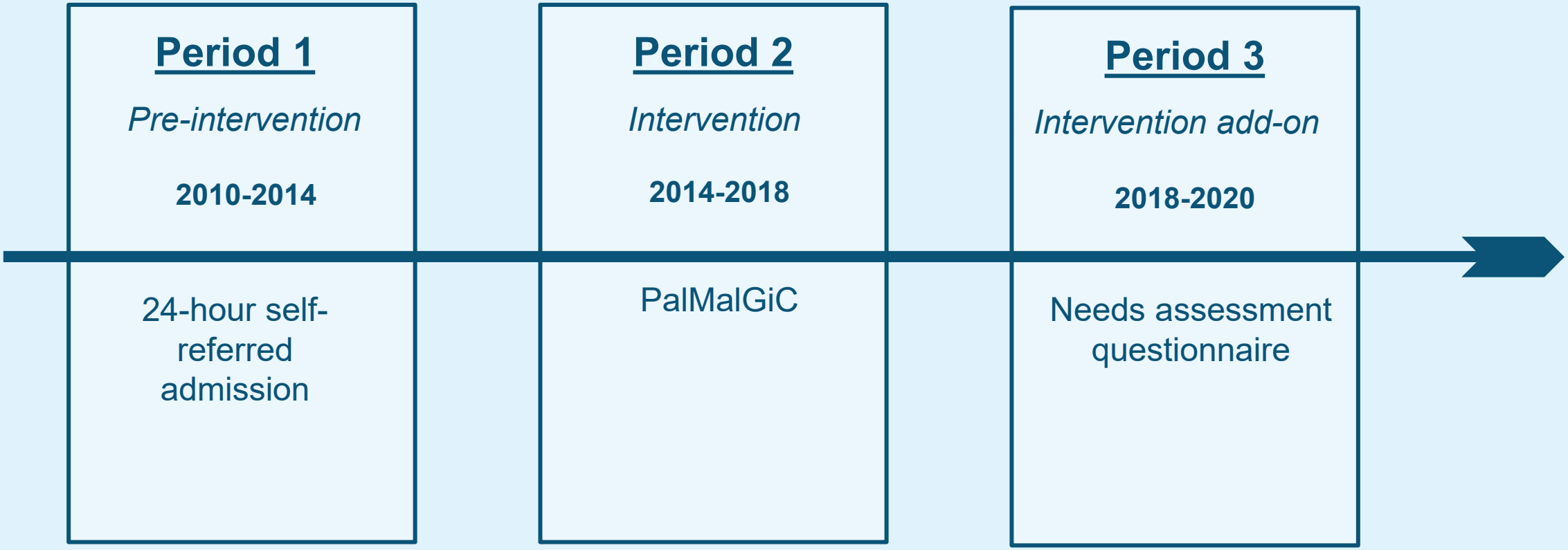
N=1518



REGION

Exposure

Exposure


Period 1
Pre-intervention
2010-2014
24-hour self-referred admission
Period 2
Intervention
2014-2018
PalMalGiC
Period 3
Intervention add-on
2018-2020
Needs assessment questionnaire

Outcomes

Hospitalization

Admissions
Length of stay

Health care use

CT, PET CT,
MRI
Surgery

Antineoplastic treatment

Chemotherapy
Radiation

Death at hospital

Last 30 days of life

Last 14 days of life

Methods

Covariates

Age, sex, cause of death, Charlsson Comorbidity Index, education level, cohabitation status, specialized palliative care affiliation

Hospitalizations and hospital deaths

Hospitalization and hospital deaths *Exposed vs unexposed (ref)*		Pre-intervention		Intervention		Intervention add-on	
		Exposed N=652	Unexposed N=17.248	Exposed N=540	Unexposed N=15.734	Exposed N=326	Unexposed N=9385
Hospitalized within the last 30 days OR (95% CI)	n (%)	412 (63%)	10.712 (62%)	350 (65%)	9363 (60%)	238 (73%)	6001 (64%)
	Crude	1.06 (0.90-1.25)		1.25 (1.05-1.50)		1.53 (1.19-1.96)	
	Adjusted***	1.20 (1.02-1.42)		1.35 (1.12-1.62)		1.62 (1.26-2.01)	
Hospital admissions within the last 30 days RR (95% CI)	Median (range)	1 (0-4)	1 (0-7)	1 (0-3)	1 (0-6)	1 (0-4)	1 (0-6)
	Crude	1.00 (0.92-1.09)		1.08 (0.99-1.19)		1.11 (0.99-1.24)	
	Adjusted**	1.06 (0.97-1.16)		1.13 (1.03-1.24)		1.13 (1.01-1.27)	
Length of stay estimate (95% CI)	Median (range)	3 (0-30)	3 (0-30)	4.5 (0-30)	3 (0-30)	5 (0-30)	3 (0-30)
	Crude	1.09 (0.96-1.24)		1.26 (1.10-1.46)		1.20 (1.01-1.42)	
	Adjusted*	1.16 (1.02-1.31)		1.29 (1.12-1.49)		1.21 (1.02-1.44)	
Hospital deaths OR (95% CI)	n (%)	335 (51%)	7923 (46%)	288 (53%)	6155 (39%)	160 (49%)	3140 (34%)
	Crude	1.24 (1.06-1.45)		1.78 (1.50-2.11)		1.91 (1.54-2.39)	
	Adjusted***	1.43 (1.21-1.68)		1.92 (1.60-2.29)		1.94 (1.55-2.44)	

REGION H

Hospital healthcare use

No difference between exposed and unexposed!

Overview of studies

1	2	3	4
Qualitative evaluation of a palliative care case management intervention for patients with gastrointestinal cancer (PalMaGiC) in a hospital department	Associations between health-related quality of life and subsequent need for specialized palliative care and hospital utilization in patients with gastrointestinal cancer – A prospective cohort study	Palliative care case management in a surgical department for patients with gastrointestinal cancer – A register-based cohort study	Aggressive end-of-life care during the last 30 days of life – A nationwide study of patients with gastrointestinal cancer
Gerhardt, S. Herling, S et al. *European Journal of Oncology Nursing 2018*	**Gerhardt, S. Krarup, P-M. et al.** *Supportive Care in Cancer 2024*	**Gerhardt, S. Krarup, P-M. et al.** *Supportive Care in Cancer 2024*	**Gerhardt, S. Krarup, P-M. et al.** *Under review in Acta Oncologica 2024*

ACTA ONCOLOGICA
2024, VOL. 63, 915–923
https://doi.org/10.2340/1651-226X.2024.41008

MJS PUBLISHING

ORIGINAL ARTICLE

Aggressive end-of-life care in patients with gastrointestinal cancers – a nationwide study from Denmark

Stine Gerhardt[a], Kirstine Skov Benthien[b,c], Suzanne Herling[d], Marie Villumsen[e] and Peter-Martin Krarup[a]

Aim

To investigate the determinants of aggressive end-of-life care in patients with gastrointestinal cancer

Bispebjerg Hospital
Digestive Disease Center

Studies 1 2 3 4

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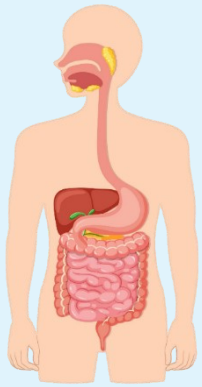
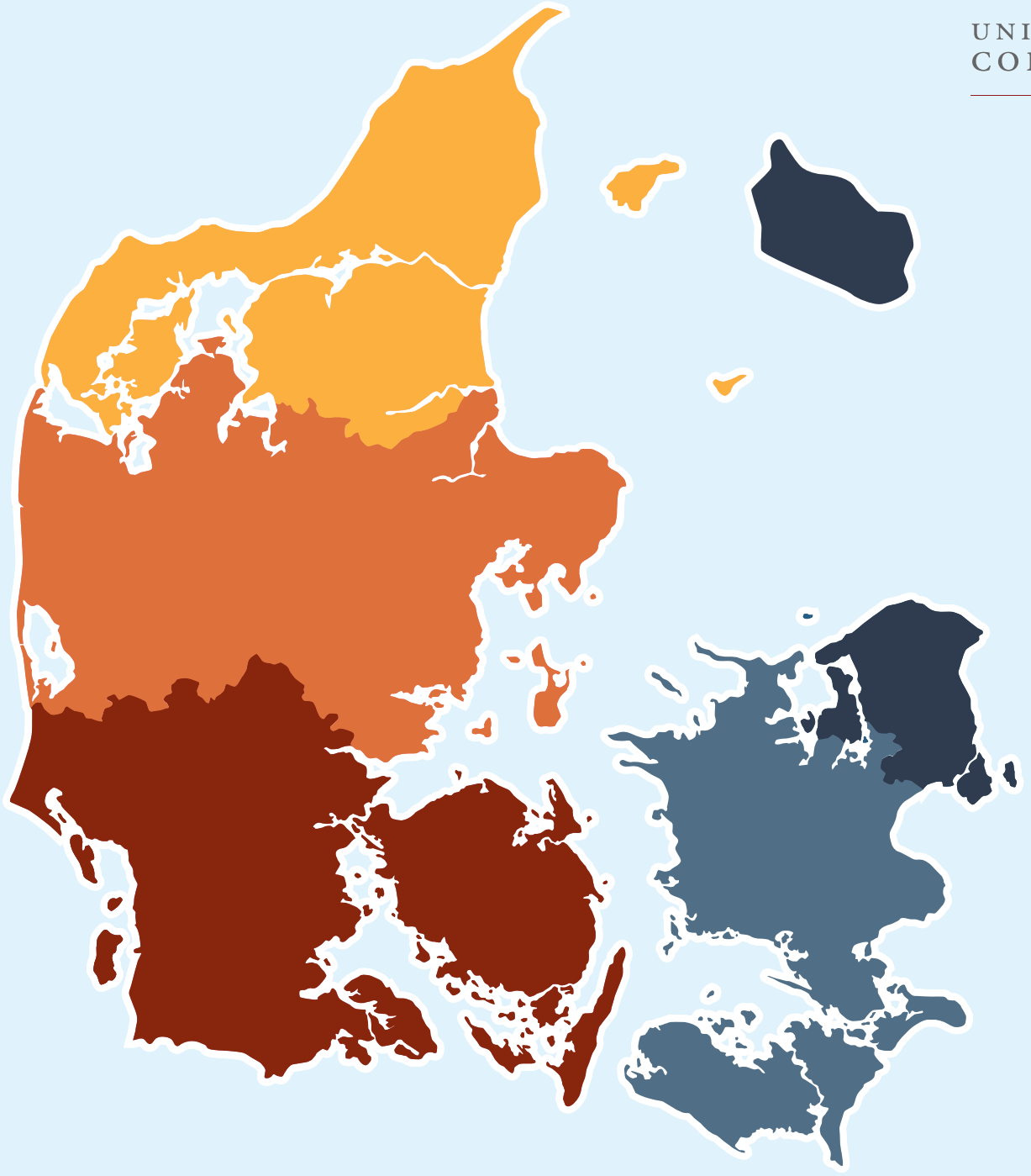
Cohort

2010 – 2020

N=43.969





REGION

Outcomes

Hospitalization

Admissions

Length of stay

Health care use

CT, PET CT,

MRI

Surgery

Antineoplastic treatment

Chemotherapy

Radiation

Death at hospital

Last 30 days of life

Last 14 days of life

Methods

Explanatory variables

Cancer diagnosis, age, sex, education level, cohabitation status, region of residence, comorbidity, specialized palliative care affiliation

Results

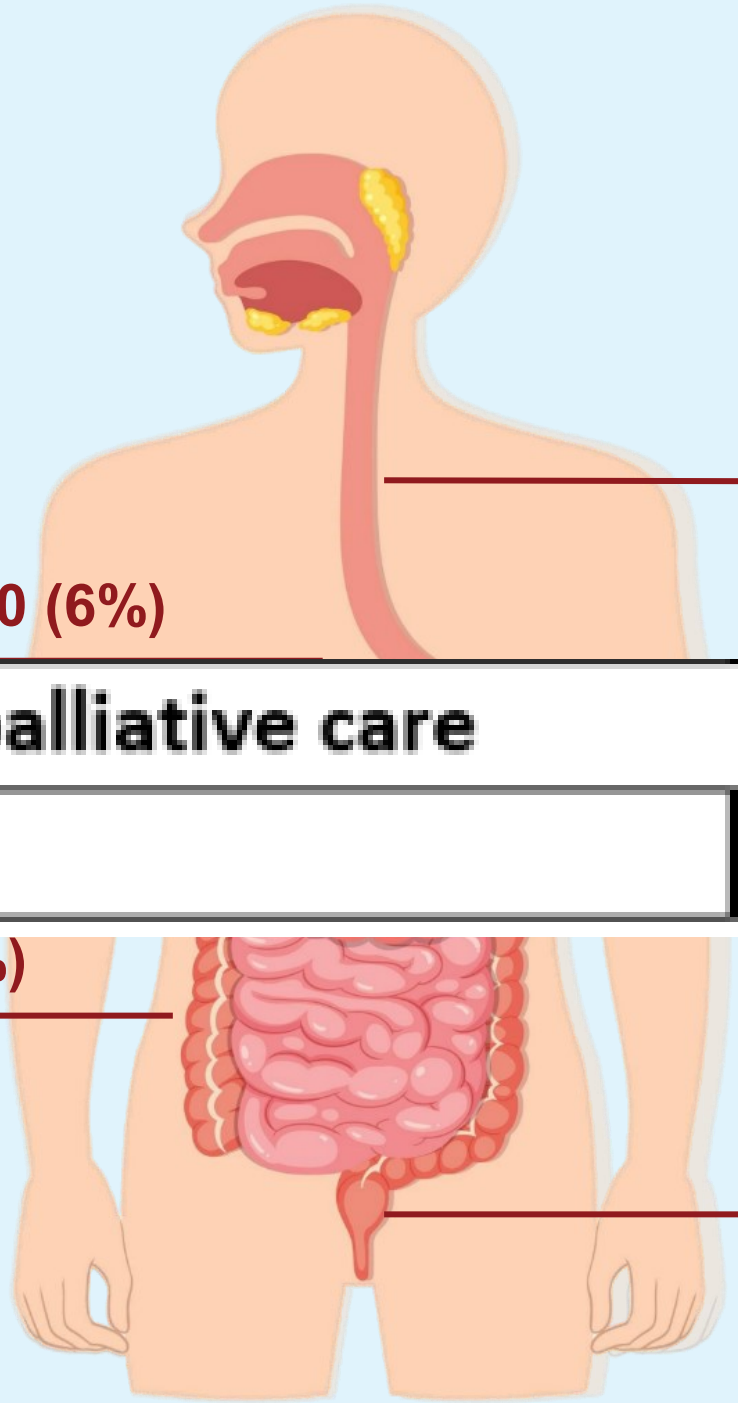
N=43.969

Esophagus n=5444 (12%)

Liver n=2590 (6%)

Specialized palliative care	
Admitted	22.118 (50%)

Colon n=12.222 (28%)



Rectum n=6511 (15%)

Other n=898 (2%)

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Results

Hospitalization (62%)

Radiological examinations (39%)

Death at the hospital (41%)

Surgery (10%)

Antineoplastic treatment (3%)

REGION

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Aggressive end-of-life care risk factors

Hospitalization

Death at the hospital

Radiological examinations

- Pancreatic cancer
- Age (18-64 years)
- Higher education level
- Male
- Charlson Comorbidity Index ≥ 2
- Divorced
- Capital Region of Denmark

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Aggressive end-of-life care risk factors

Hospitalization

- Pancreatic cancer
- Age (18-64 years)
- Higher education level
- Male
- Charlson Comorbidity Index ≥ 2
- Divorced
- Capital Region of Denmark
- Bile duct cancer
- Liver cancer

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Aggressive end-of-life care risk factors

Death at the hospital

- Pancreatic cancer
- Age (18-64 years)
- Higher education level
- Male
- Charlson Comorbidity Index ≥ 2
- Divorced
- Capital Region of Denmark
- Widow

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Aggressive end-of-life care risk factors

Surgery

- Age (18-64 years)
- Higher education level
- Male
- Colon cancer
- North Region Denmark
- Region of Southern Denmark
- Central Denmark Region

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Aggressive end-of-life care risk factors

Antineoplastic treatment

- Pancreatic cancer
- Age (18-64 years)
- Male
- Charlson Comorbidity Index < 2
- Region of Southern Denmark

REGION

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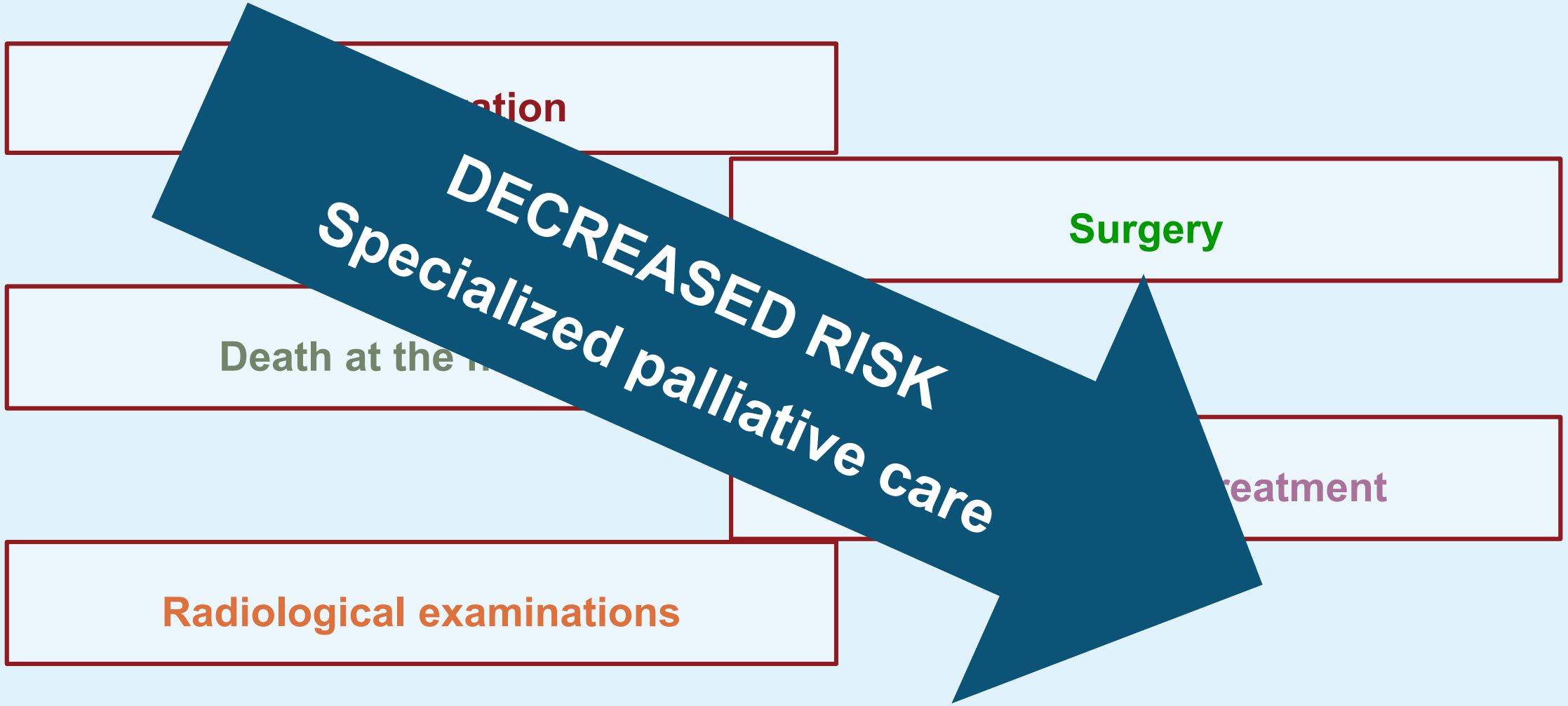
Aggressive end-of-life care risk factors



REGION H

Conclusions

- Patients perceived PalMaGiC as a lifeline facilitation QoL
- more likely to be hospitalized and die at the hospital
- Increased attention to symptom burden, lack of physician involvement, and lack of systematic community care collaboration could be potential factors
- Severe symptom burden
- Pain is associated with specialized palliative care referral
- Confront a high risk of aggressive end-of-life care, which is determined by cancer type, comorbidities, sociodemographic factors, and affiliation with specialized palliative care

Conclusions

- There is a vast potential to reduce aggressive end-of-life care, as demonstrated by the impact of specialized palliative care
- Imperative to adjust intervention components to mitigate aggressive end-of-life care, improve needs assessment, and promote advance care planning

- **Do patients affiliated with PalMaGiC tend to contact the specialist nurse because they can rely on a genuine response?**

- **Does the organization of PalMaGiC limit related actions?**

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Perspective

PaIMaGiC

?

REGION H

Integrated care pathway

PalMaGiC

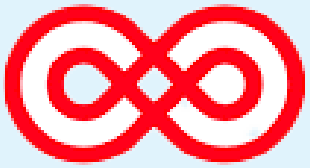
Palliative care physician

Community collaboration

Home-based approach

for patients at a high risk of aggressive end-of-life care

Acknowledgements


Kræftens
Bekæmpelse

Research Foundation
Digestive Disease Center

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Co authors and team

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- Kirstine Skov Benthien
- Suzanne Herling
- Marie Villumsen
- Lene Jarlbæk
- Bonna Leerhøy
- Gitt Mikkelsen
- Ninette Blomberg