



The Alertness Project

Actuele richtlijnen door structurele signalering

Cor de Kroon en Kees Ebben



Alertness Project



Goal

Keeping guidelines up-to-date by continuously identifying potential topics for revision

Aim

Alerts based on:

1. new scientific developments (based on modifications of the NCCN[®] guideline)
2. variation in clinical practice (based on Real World Data)

Results

- Methodology for continuous guideline adherence measurements
- Methodology for structured guideline comparison
- Dashboard prototype to visualize guideline adherence
- Procedure to alert guideline developers

<https://iknl.nl/en/guidelines/alertness;-structural-signaling-for-up-to-date-gui>

Funding



Organizations

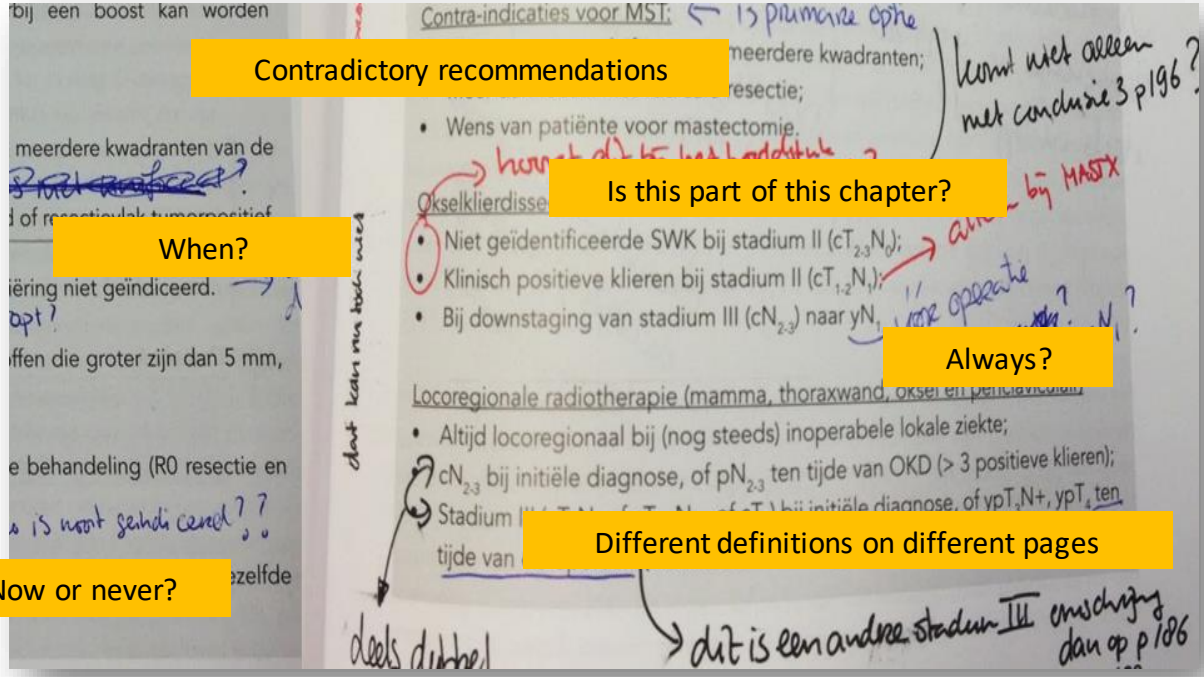


Textual guidelines

Findings

Guideline recommendations are often intertwined in large texts distributed over different chapters and modules

Textual guidelines often are inconsistent and ambiguous



Textual guidelines vs. Clinical Decision Algorithms

Text

*If extra-uterine disease is suspected:
serum CA125*

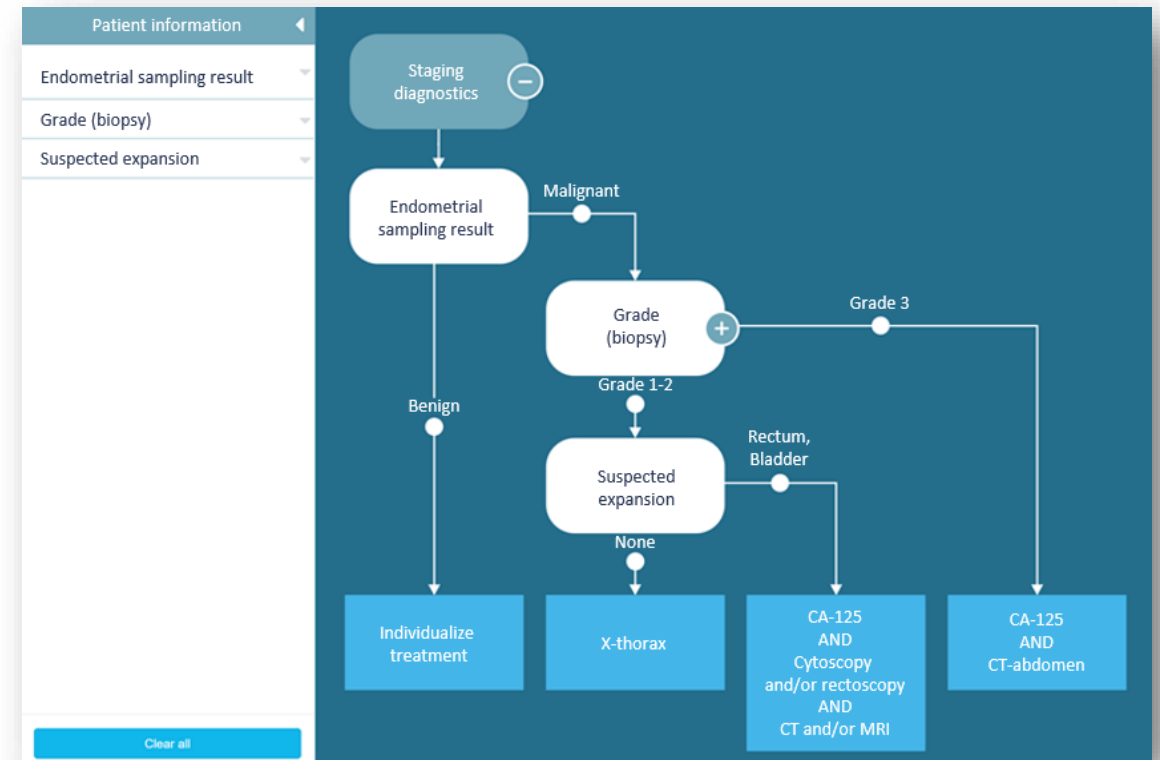
*It has been shown that of the imaging techniques
(MRI, CT scan, PET scan), the MRI has the best
predictive value for determining myometrial invasion,
especially when contrast-enhancing agents are used.*

Basic imaging

- transvaginal ultrasound (see related)*
- chest x-ray*
- cystoscopy/rectoscopy if complaints
and/or symptoms give cause for this*

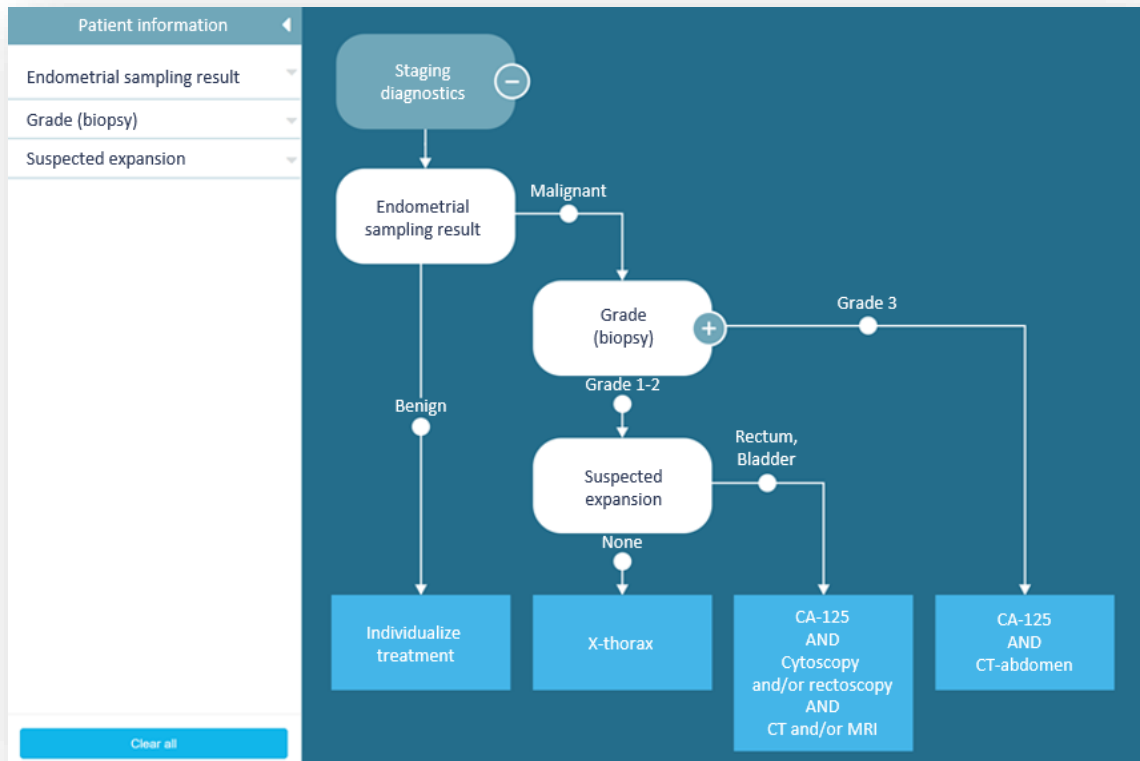
*Do not routinely perform a CT scan of the
abdomen in women with suspected low-stage
low-grade endometrial cancer.*

Clinical Decision Tree

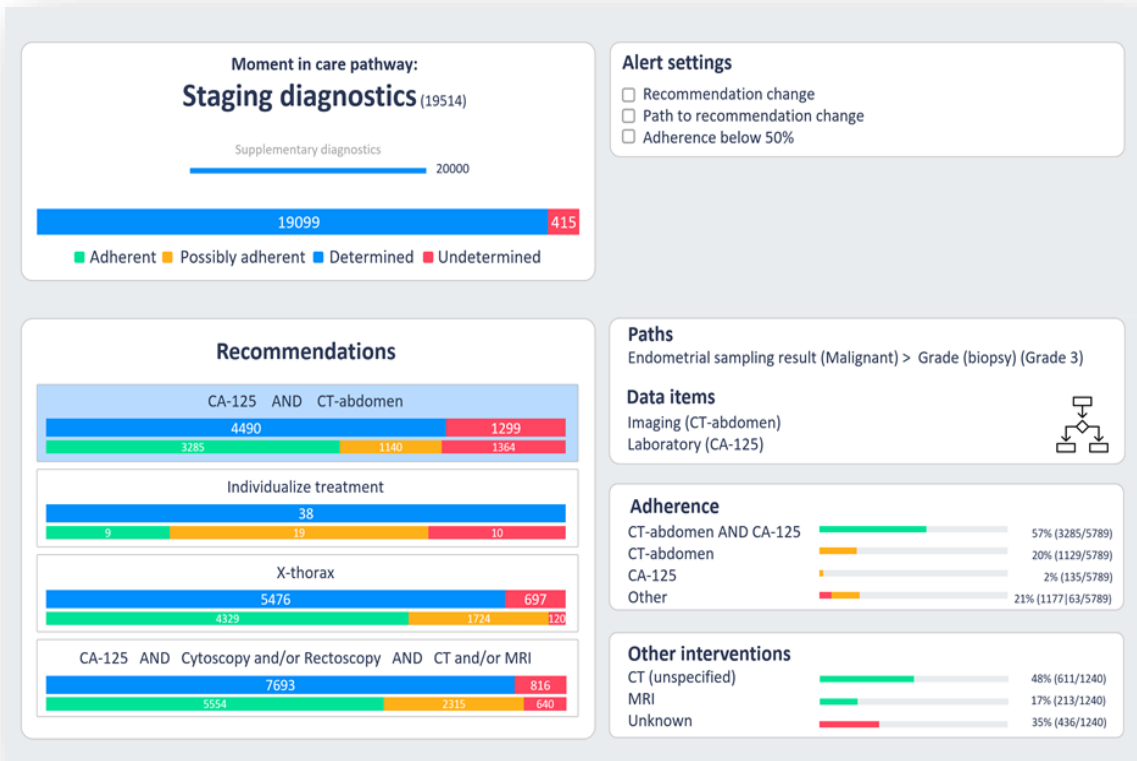


Clinical Decision Algorithms vs. Dashboard

Clinical Decision Tree

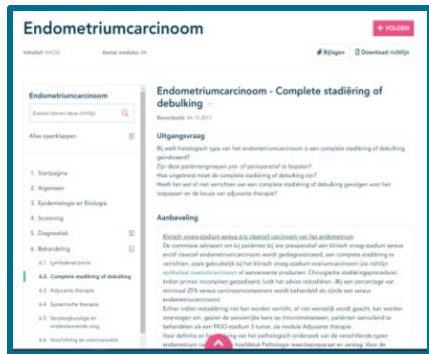


Dashboard

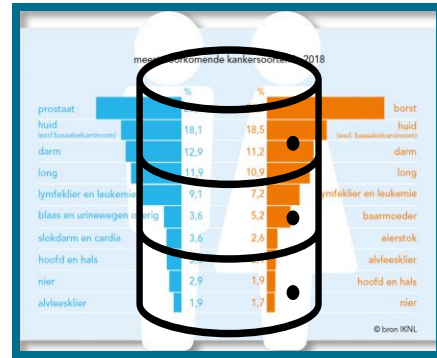


Visualizing computable guidelines

CPG + Real World Data



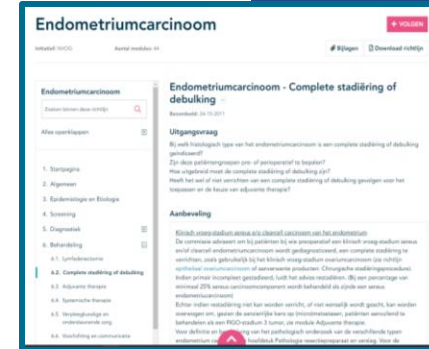
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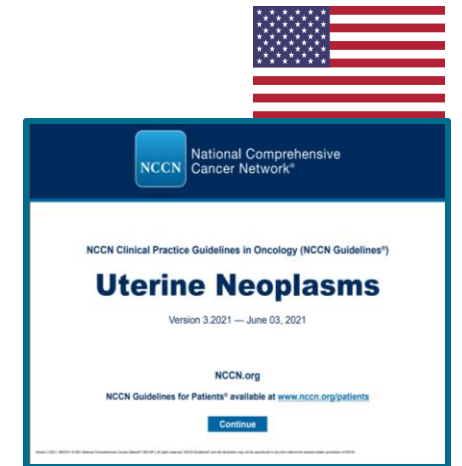
CRGO

NCR

CPG versus CPG



VS



CRGO

NCCN

CRGO: Committee on Guidelines for Gynecological Oncology

NCR: Netherlands Cancer Registry

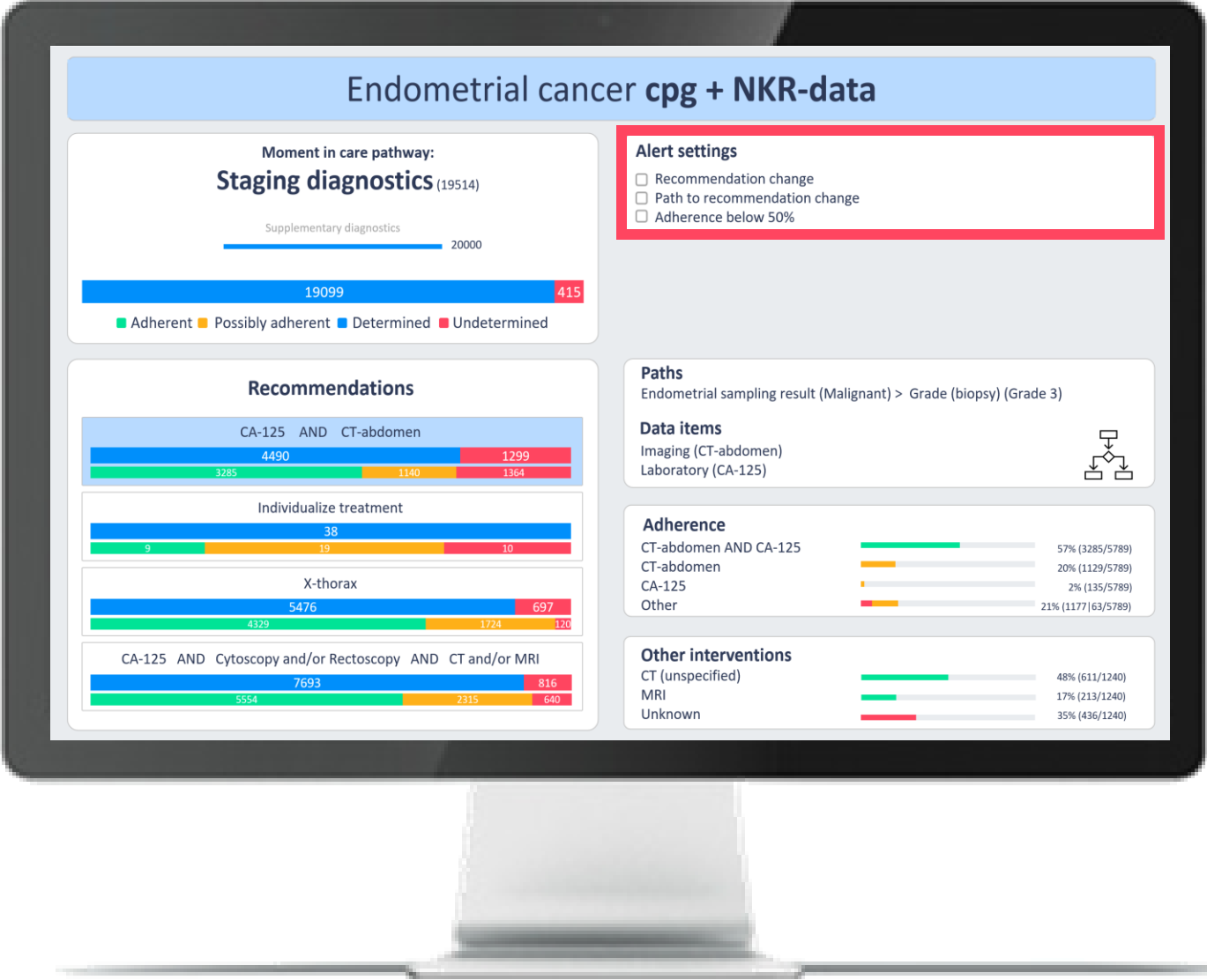
NCCN: National Comprehensive Cancer Network

Visualising data and recommendations



Alert settings

When do we need to revise a module?



Results [example]



Adherence per subpopulation

Population: Primary treatment, Endometrioid, FIGO stage I:

→ Recommendation = Total abdominal hysterectomy AND BSO, OR Total laparoscopic hysterectomy AND BSO

→ **Adherence: 82%**

Population: Adjuvant treatment, endometrioid, stage IA, Grade 1/2:

→ Recommendation = No Adjuvant Treatment

→ **Adherence: 98%**

Adherence trends over time

Recommendation implementation pace

Non-adherent treatment strategies

Identification of non-guideline characteristics that influence adherence

Results [example]

Adherence per subpopulation

Adherence trends over time

Population: Primary treatment, Endometrioid, FIGO stage I:

→ Recommendation = Total abdominal hysterectomy AND BSO, OR Total laparoscopic hysterectomy AND BSO

Year	Cases	Adherent	Non-adherent	Other
2017	1019	841 (83)	97 (10)	81 (8)
2018	984	822 (84)	109 (9)	53 (5)
2019	1106	911 (82)	130 (12)	65 (6)
2020	1176	957 (81)	150 (13)	69 (6)
2021	1168	956 (82)	159 (14)	53 (5)

Recommendation implementation pace

Non-adherent treatment strategies

Identification of non-guideline characteristics that influence adherence

Results [example]

Adherence per subpopulation

Adherence trends over time

Recommendation implementation pace

Population: Primary treatment, Sereus/Clearcell carcinoma, FIGO stage II:

→ Recommendation:

- ≤2021: Staging

- >2022: Hysterectomy

Year	Cases	Staging	Hysterectomy	Other
2018	11	6	1	4
2019	4	0	3	1
2020	11	7	2	2
2021	2	1	1	0
2022	7	4	0	3

Non-adherent treatment strategies

Identification of non-guideline characteristics that influence adherence

Results [example]



Adherence per subpopulation

Adherence trends over time

Recommendation implementation pace

Non-adherent treatment strategies

Population: Primary treatment, Sereus/Clearcell carcinoma, FIGO stage I:

Intervention	Frequency
No surgery	48
TAH AND BSO	88
TLH AND BSO	198
UE incl BSO	<10
TAH (only)	14

Intervention (cont)	Frequency
TLH (only)	13
UE wo BSO	12
Radical UE	<10
Debulking	10
Staging surgery*	601

Identification of non-guideline characteristics that influence adherence

Results [example]

Adherence per subpopulation

Adherence trends over time

Recommendation implementation pace

Non-adherent treatment strategies

Identification of non-guideline characteristics that influence adherence

Population: Primary treatment, Endometrioid, FIGO stage I:

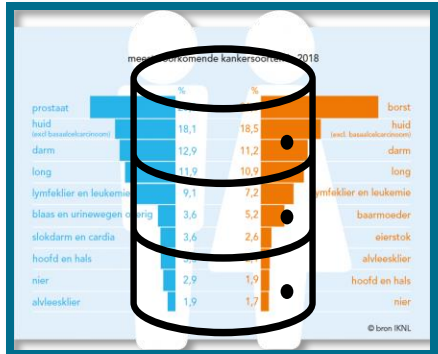
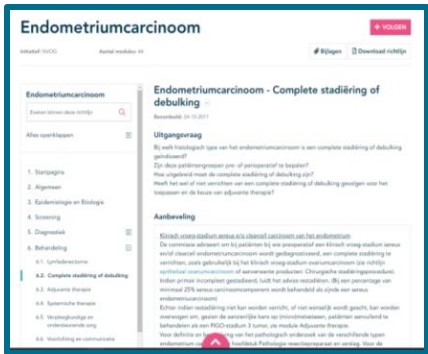
→ Recommendation = Total abdominal hysterectomy AND BSO, OR Total laparoscopic hysterectomy AND BSO

Age	Cases	Adherent	Non-adherent	Other
<=59	1667	1381 (83)	161 (10)	125 (7)
60-69	2377	2063 (87)	178 (7)	136 (6)
70-79	2229	1873 (84)	215 (10)	141 (6)
>=80	974	638 (66)	253 (26)	83 (9)
Total	7247	5955	807	485

Visualizing computable guidelines



CPG + Real World Data



+

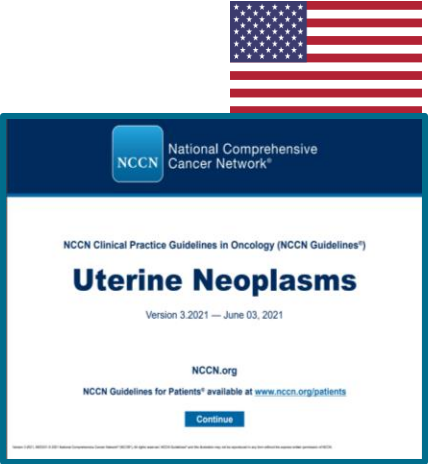
CRGO

NCR

CPG versus CPG



VS



CRGO

NCCN

CRGO: Committee on Guidelines for Gynecological Oncology
 NCR: Netherlands Cancer Registry
 NCCN: National Comprehensive Cancer Network

Visualising recommendation comparisons



Alert settings

When do we need to revise a module?



The screenshot shows a web application interface for recommendation comparisons. On the left is a 'FILTER' sidebar with dropdown menus for 'Beleid', 'Leeftijd', 'cM', 'cN', and 'cT'. Below these is a 'Histologie' section with three radio button options: 'Endometrioid carcinoom' (selected), 'Clear cell adenocarcinoom', and 'Sereus adenocarcinoom'. At the bottom of the sidebar are buttons for 'Add data item', 'Add filter group', and 'Apply'. The main content area is titled 'Primaire behandeling (v 2022)' and contains a 'Recommendation comparison' table. The table has two columns: 'NVOG' and 'NCCN'. The 'NVOG' column lists 'Totale abdominale hysterectomie' and 'Totale laparoscopische hysterectomie'. The 'NCCN' column lists 'Total hysterectomy + BSO + Surgical staging' (with sub-points for suitability), 'Consider hormone therapy' (with sub-point for suitability), 'EBRT AND/OR Brachytherapy' (with sub-point for suitability), and 'EBRT' (with sub-point for suitability).

Primaire behandeling (v 2022)	
Recommendation comparison	
NVOG	NCCN
Totale abdominale hysterectomie	Total hysterectomy + BSO + Surgical staging <ul style="list-style-type: none">• cT: cT1, cT1b EN Suitable for primary surgery: Suitable• cT: cTa EN Suitable for primary surgery: Suitable
Totale laparoscopische hysterectomie	Consider hormone therapy <ul style="list-style-type: none">• Suitable for primary surgery: Not suitable
	EBRT AND/OR Brachytherapy <ul style="list-style-type: none">• cT: cT1, cT1b EN Suitable for primary surgery: Not suitable
	EBRT <ul style="list-style-type: none">• cT: cT1, cT1b EN Suitable for primary surgery: Suitable

Analysis results



Calculating comparison

Content representation evaluation

Corresponding subpopulations recommendations

Analysis results



Calculating comparison

		No. PDCs	No. Interventions	No. Recommendations	No. Unique treatment strategies			No. PDCs	No. Interventions	No. Recommendations	No. Unique treatment strategies
GOPS	NVOG CDTs					NCCN	CDTs				
Initial diagnosis											
	Initial diagnostics	0	3	1	1	Initial evaluation		0	9	1	1
	Additional diagnostics	1	2	1	1	Initial work-up imaging		4	5	5	5
	Staging diagnostics	3	8	4	4	Additional chest imaging		3	3	7	3
						Additional diagnostics		2	4	8	5
						Additional diagnostics for incidental findings		1	2	2	2
Total		4	13	6	6			10	23	23	16
Initial treatment											
	Primary treatment	8	15	23	12	Primary treatment		9	19	38	21

Grand total		33	80	76	54			59	109	188	124

Content representation evaluation

Corresponding subpopulations recommendations

Analysis results



Calculating comparison

Content representation evaluation

GOCPS	Primitives	Present in both guidelines	SCT	Correlated between guidelines				NVOG only	SCT	NCCN only	SCT
				NVOG term	SCT	NCCN term	SCT				
Initial diagnosis											
	CDTs	Additional diagnosis	NA	Initial diagnostics	NA	Initial evaluation	NA	Staging diagnostics	NA	Initial work-up imaging	NA
										additional chest imaging	NA
										additional diagnostics for incidental findings	NA
	PDCs	Grade	277059002					Ultrasound result	0	Fertility preservation	702596005
								Endometrial sampling result	0	MRI contraindication	0
								Suspicion of extension	0	Type of diagnosis	106229004

Corresponding subpopulations recommendations

Analysis results



Calculating comparison

Content representation evaluation

Corresponding subpopulations recommendations

Identical and Similar Clinical Decision Trees	Identical populations	Population definition	Recommendation NVOG	Recommendation NCCN
Initial diagnostics (NVOG) AND Initial evaluation (NCCN) ^α	1	NA	➤ Anamnesis AND Gynecological physical exam AND Transvaginal ultrasound ^β	➤ History AND Physical AND Complete blood count AND Endometrial biopsy AND Genetic evaluation of tumor AND Evaluation for inherited cancer AND Consider liver function test AND Consider renal function tests AND Consider chemistry profile ^β
Additional diagnostics	0			
Primary treatment	0			
Evaluation of staging	2	1. Result staging=complete 2. Result staging=Incomplete	➤ Adjuvant treatment ^α ➤ Restaging	➤ Adjuvant treatment ^α ➤ NA: Separate algorithm for further policy
Adjuvant treatment endometrioid carcinoma	5	1. FIGO-stage=IB AND Grade=1 AND Age<60 AND LVSI=No	➤ No adjuvant treatment ^β	➤ Consider observation ^β
Total	11		2 identical; 5 correlated/overlapping	

Take home messages



Visualising data and recommendations

Translation of text to CDTs using information standards enables reusing data

Combining CDTs and Real-World Data supports a learning health system

This methodology is scalable to other diseases and settings

Computable guideline formats enhance quality of care

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