

# Radiologische Befunde: GGO & Co, Milchglas und seine Differentialdiagnosen

Ap. Prof. Priv.-Doz. Dr. Lucian Beer, PhD

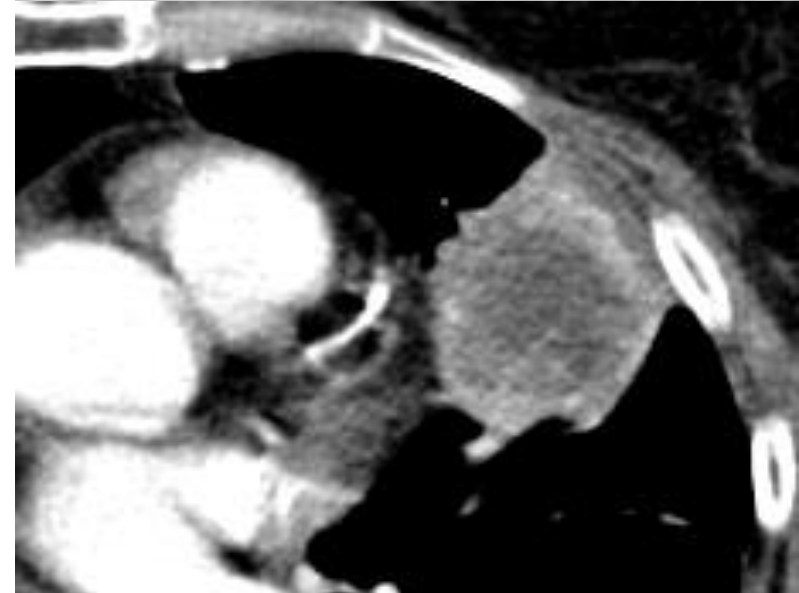
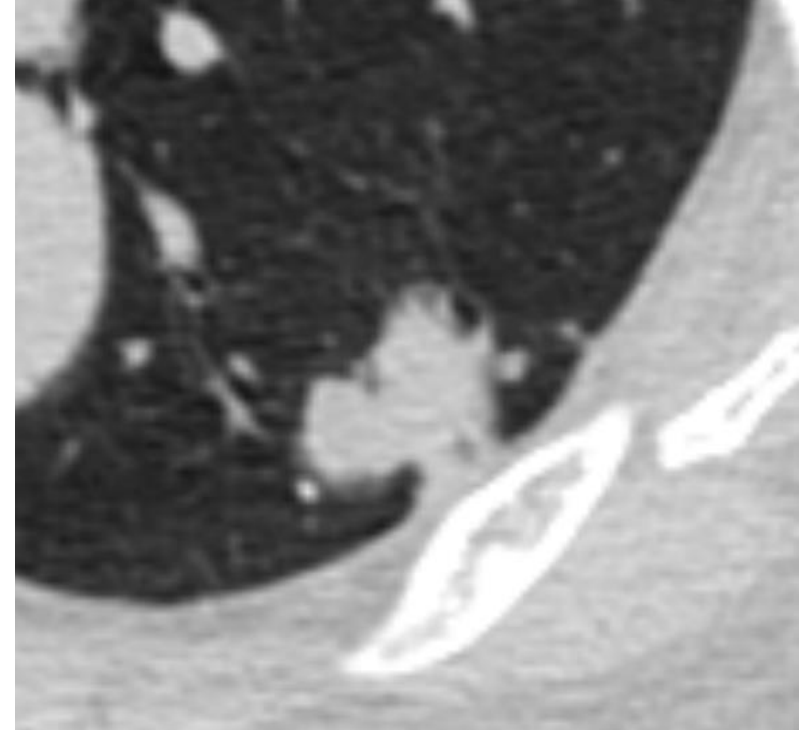
Universitätsklinik für Radiologie und Nuklearmedizin

Ich habe keinen potenziellen Interessenkonflikt zu berichten.

# Definition

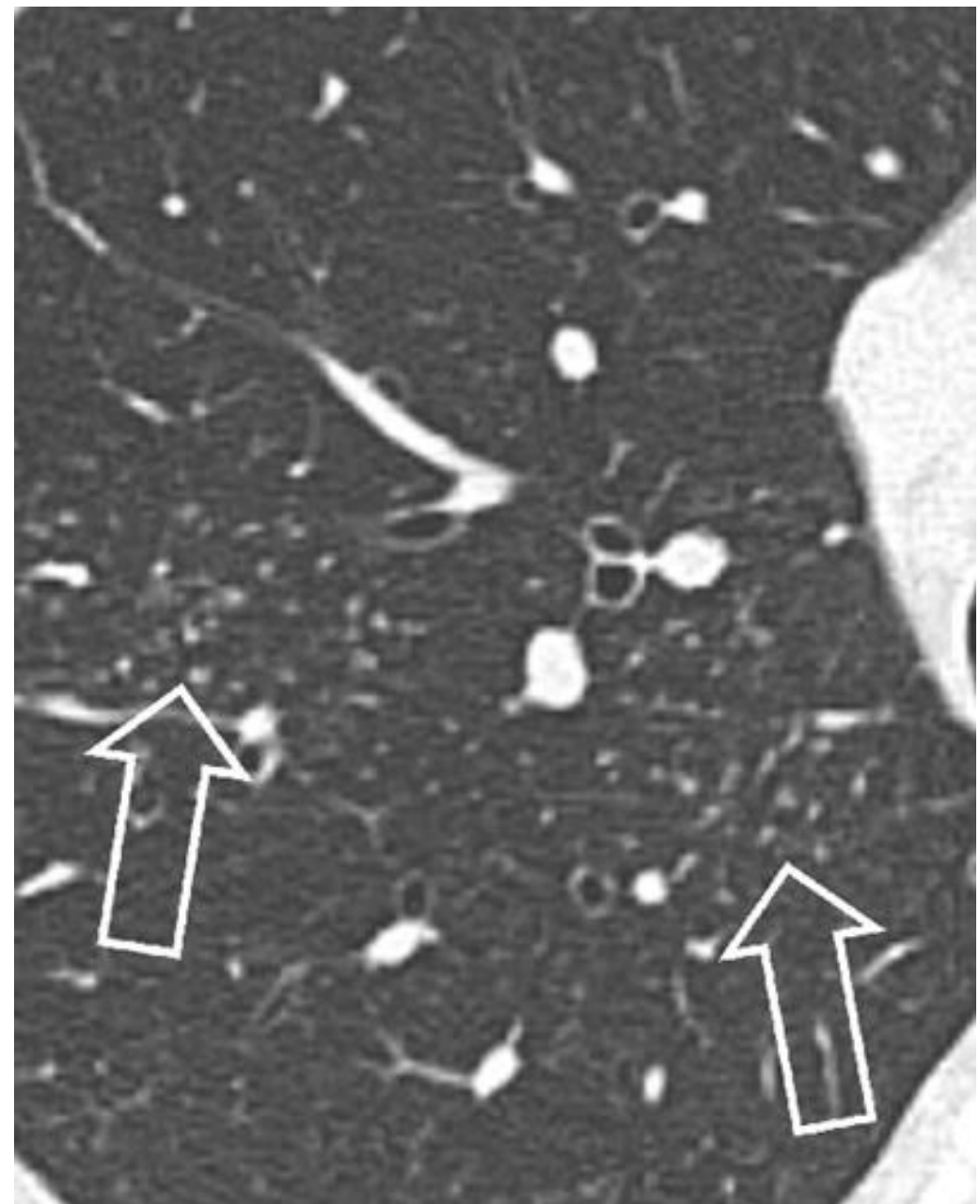
**Rundherd**: pulmonale Verdichtung bis zu 0,7-3 cm Durchmesser

**Raumforderung**: > 3 cm Durchmesser

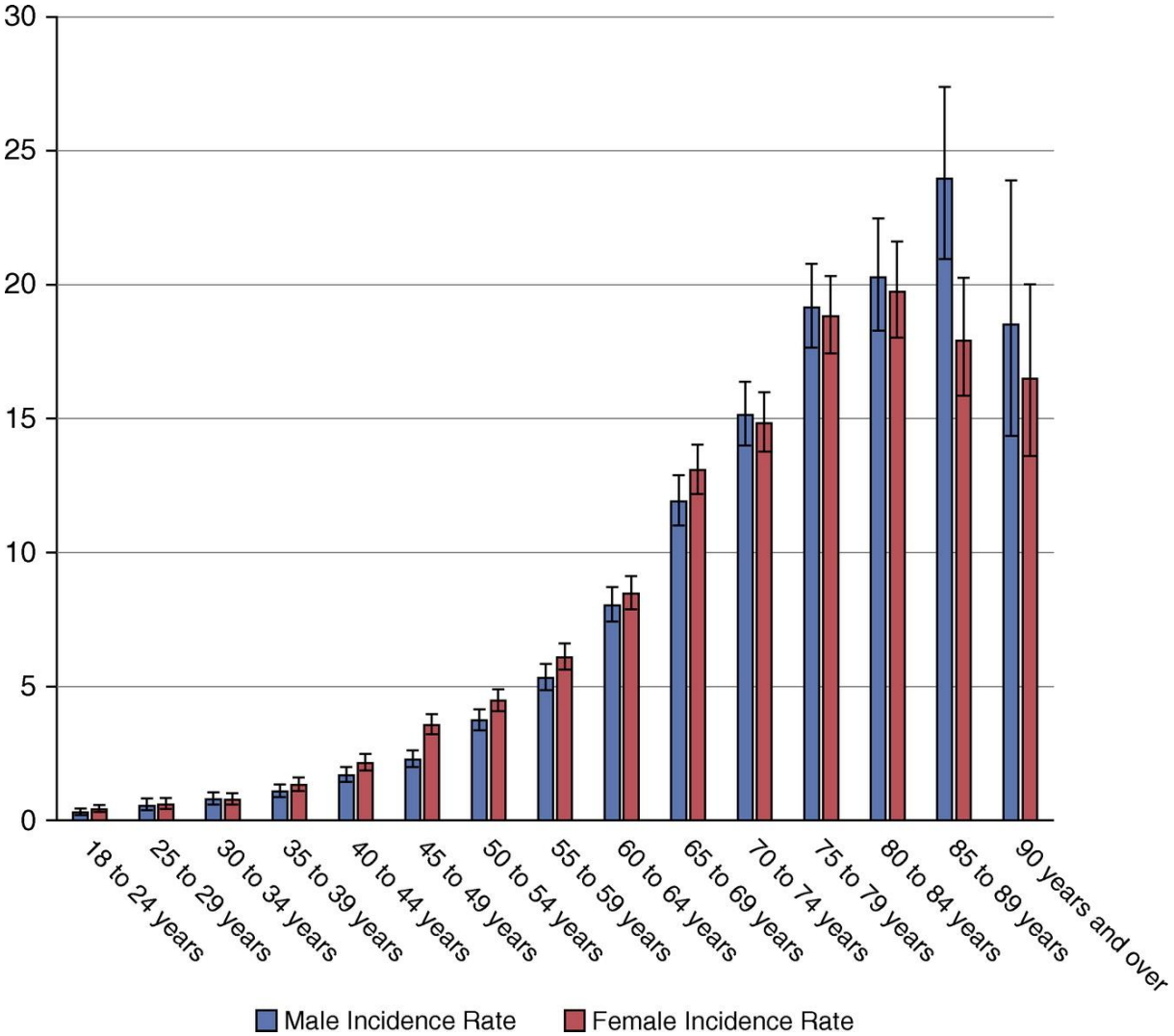


# Definition

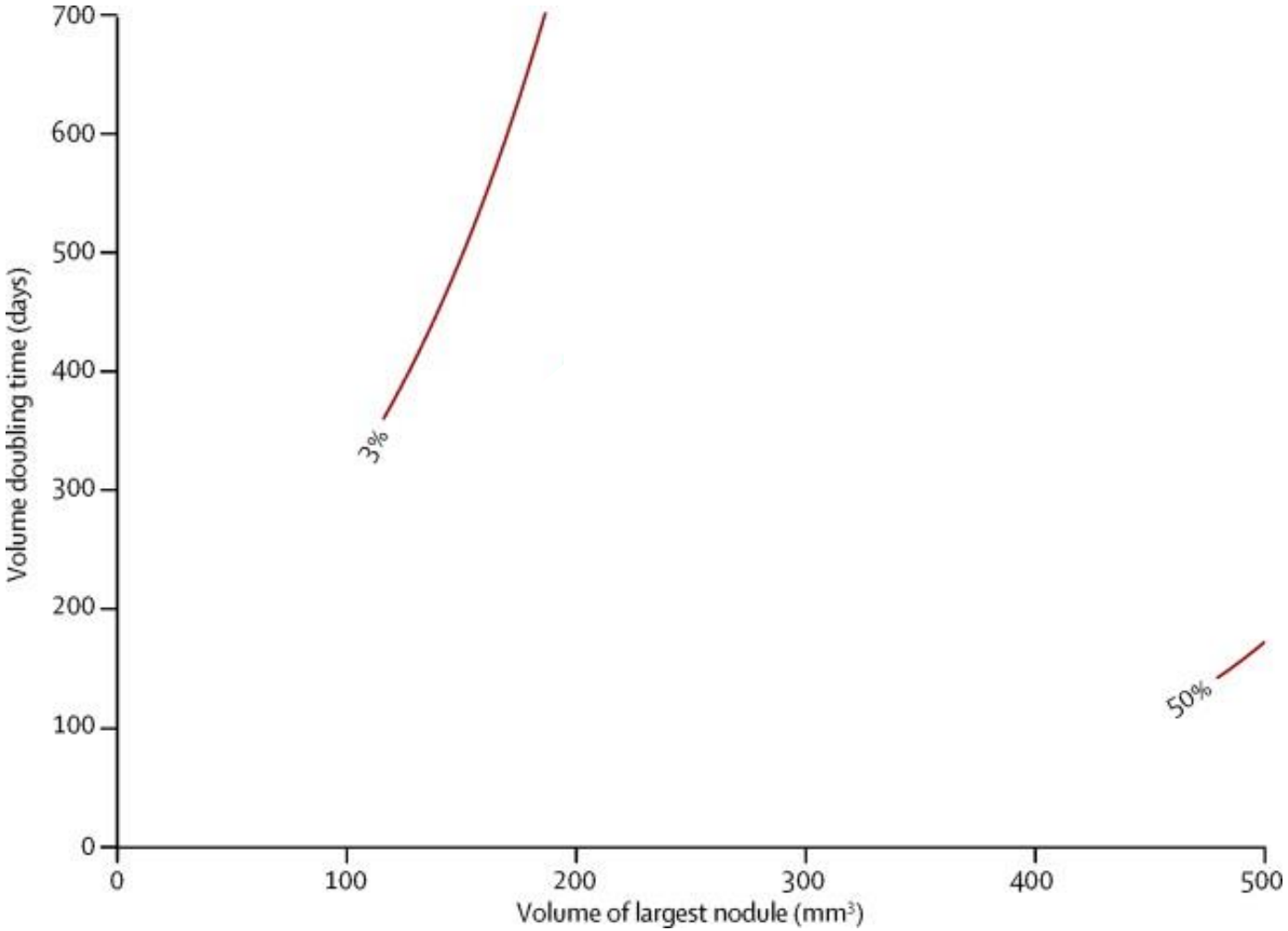
**Mikronodulus:** < 0.7 cm Durchmesser



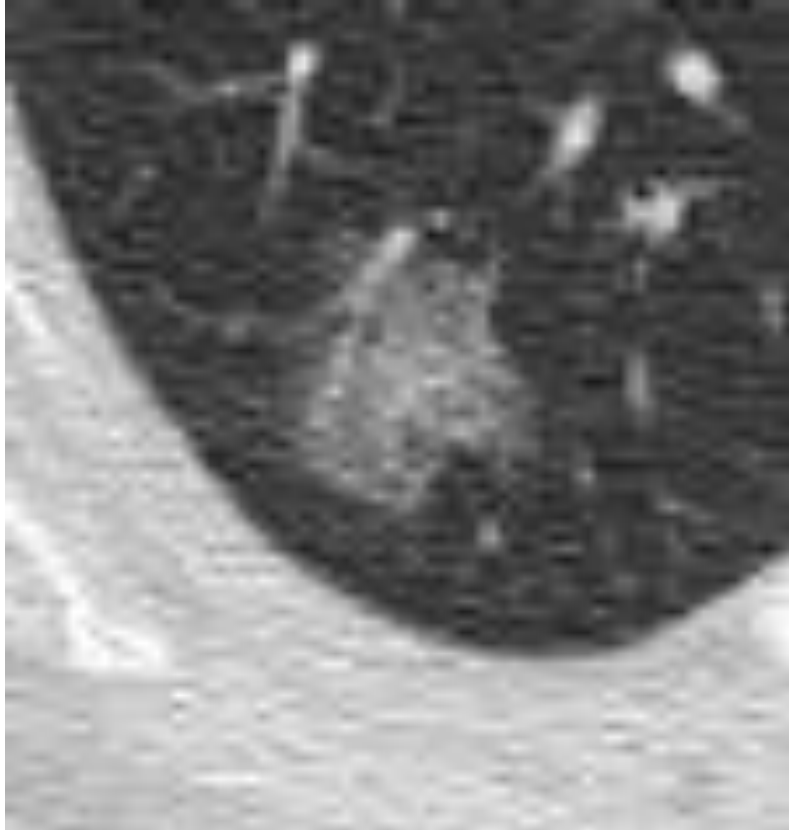
# Prävalenz Rundherde -Zufallsbefund



# Risikostratifizierung: Größe (Volumen) & Wachstum



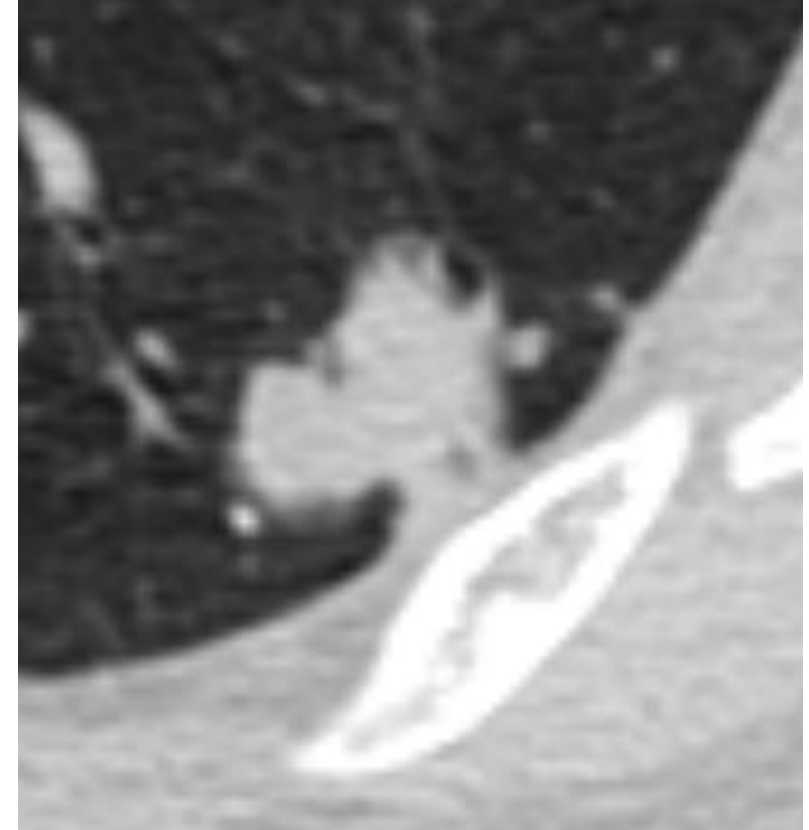
Milchglas (GGN)



Teilsolide

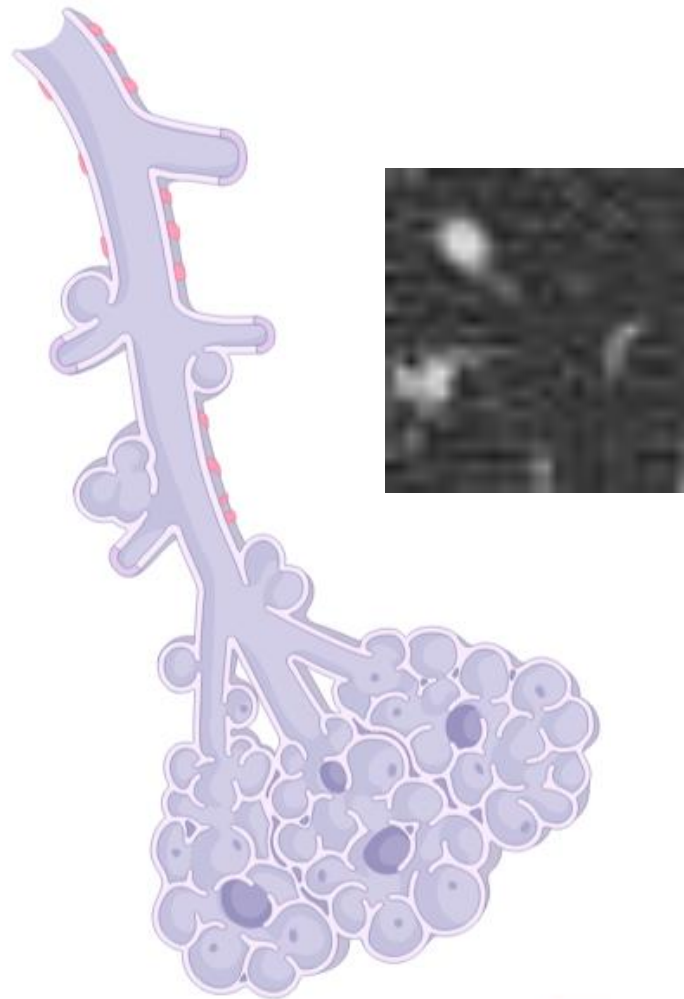
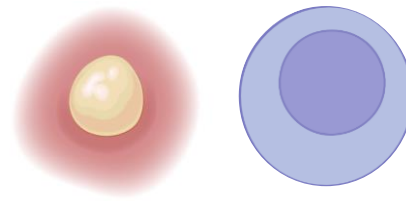


Solide

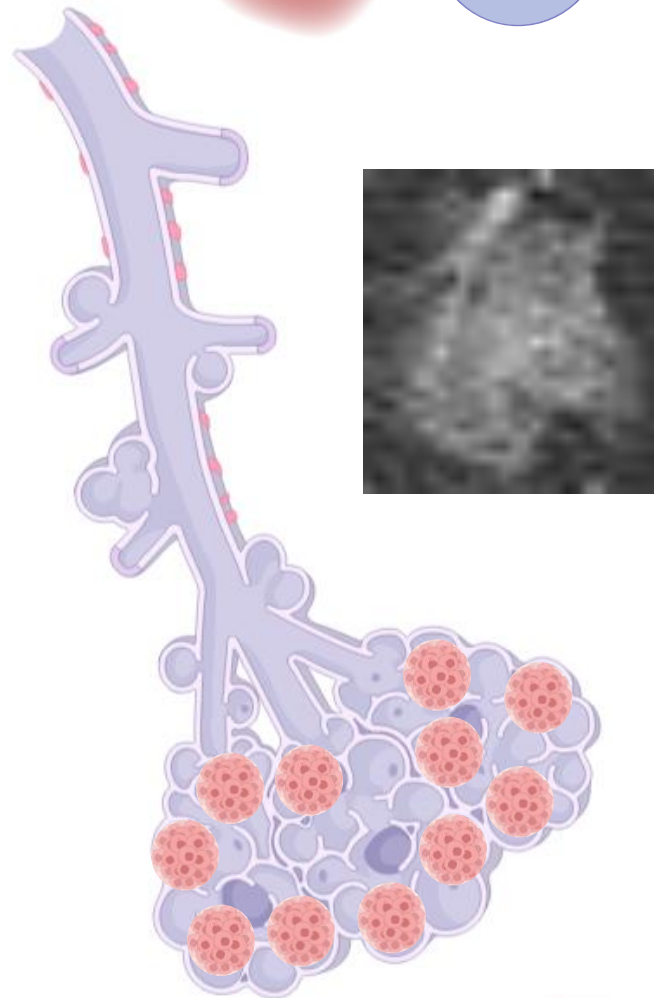


**Malignitätsrisiko**

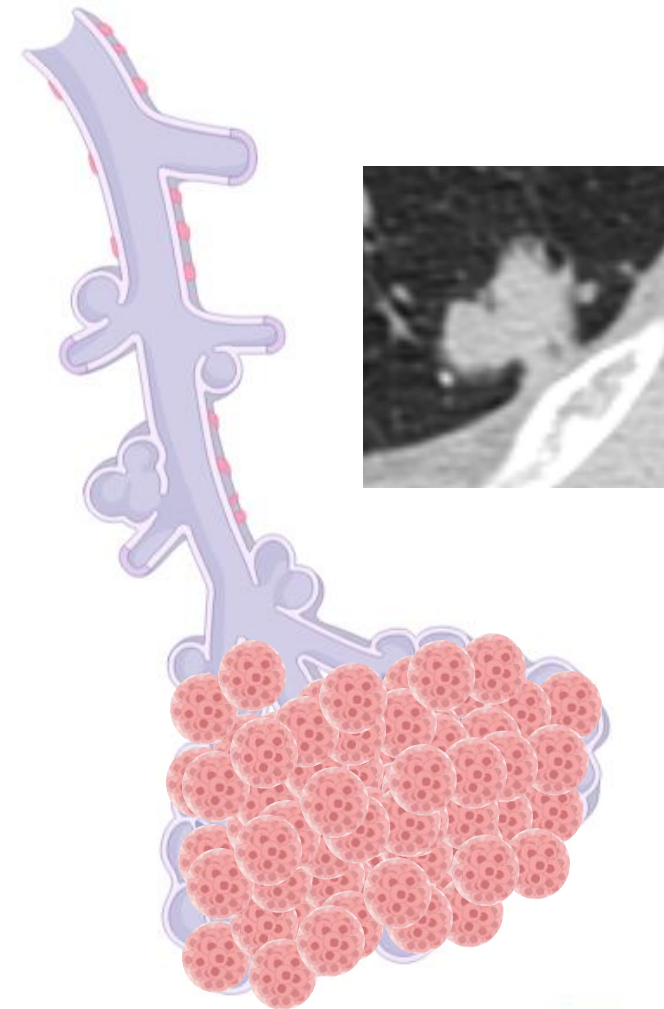
# Was bedeutet GGN



Created in [BioRender.com](https://www.biorender.com) 



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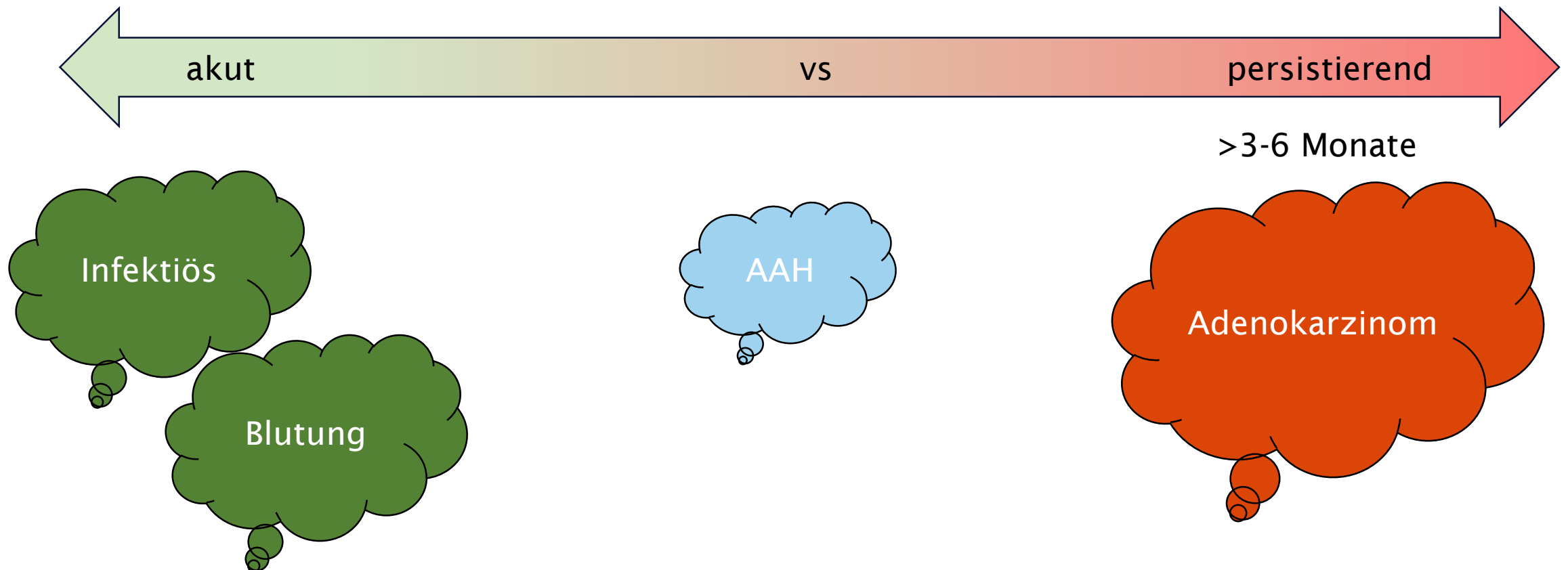


Created in [BioRender.com](https://www.biorender.com) 

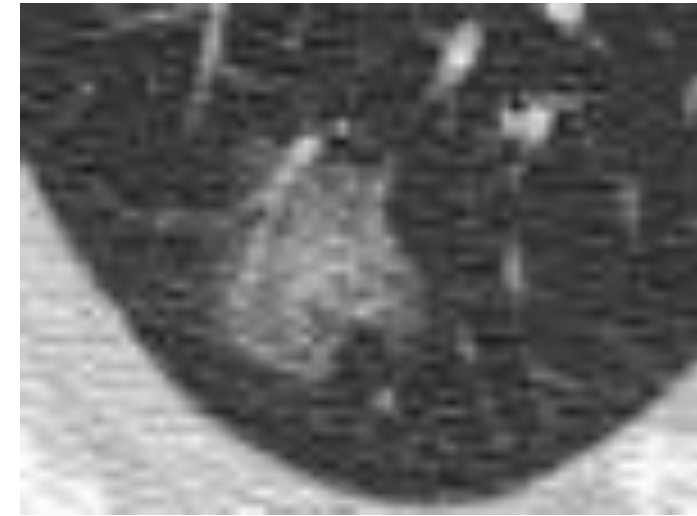


# Differentialdiagnosen eines GGN

**Frage:** Seit wann ist das GGO bekannt?



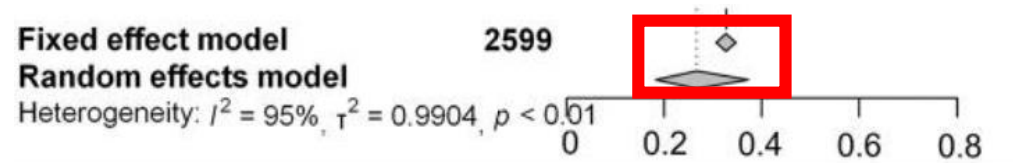
# Malignitätsrisiko pGGN im Screening (NLST-data)



Lung-RADS Category at Baseline	Expected Malignancy Rates according to Lung-RADS (%) <sup>*</sup>	No. of Patients <sup>†</sup>	Cancer Rate (%) <sup>‡</sup>
Category 2	<1	304/434 (77)	3 (1.8, 5.9)
GGN <10 mm		129/304 (42)	1.3 (0.3, 5.1)
GGN 10–19 mm		153/304 (50)	5.7 (3, 11)
GGN 20–29 mm		22/304 (7)	9 (3, 28)

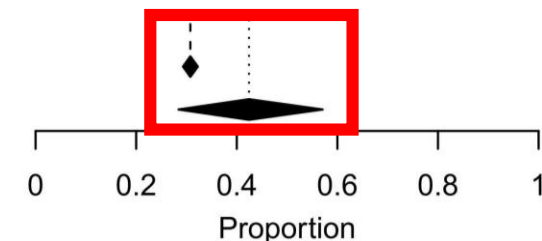
# Malignitätsrisiko von pGGN– Metaanalyse (nicht-Screening Population)

**~20-60% invasive Karzinome**

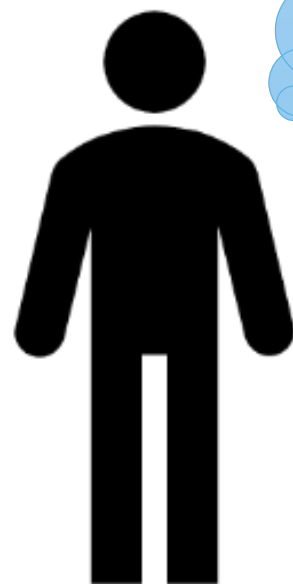
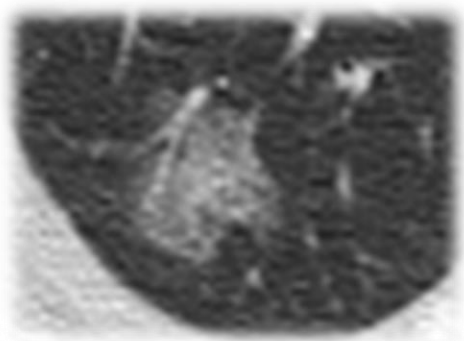


Total (fixed effect, 95% CI)	3874	100.0%	--	0.308 [0.293; 0.323]
Total (random effects, 95% CI)		--	100.0%	0.424 [0.284; 0.571]

Heterogeneity:  $\tau^2 = 0.1473$ ;  $\text{Chi}^2 = 2075.67$ ,  $\text{df} = 27$  ( $P = 0$ );  $I^2 = 99\%$

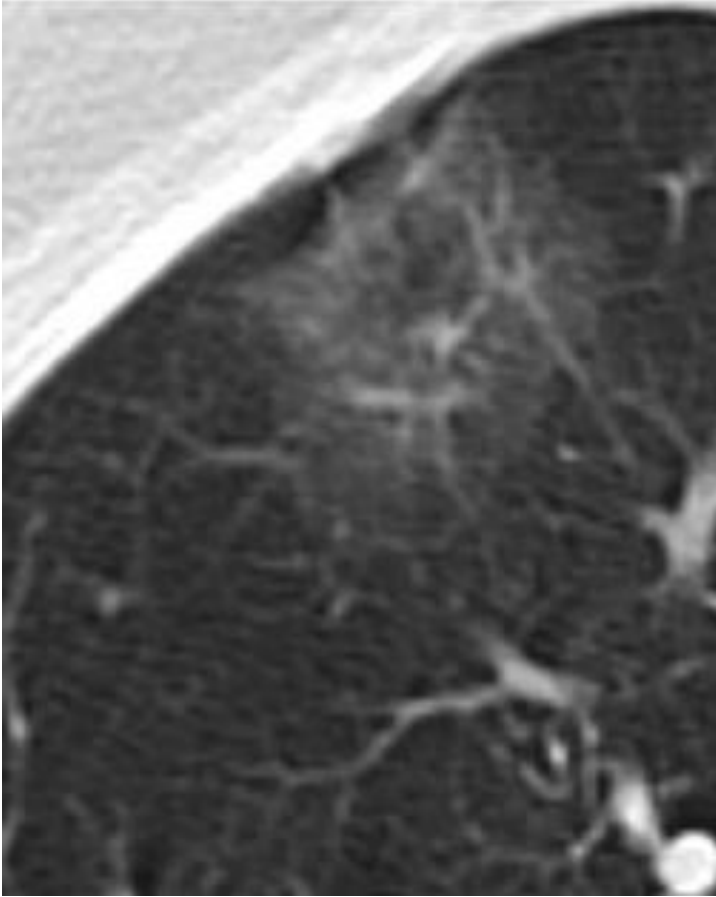


**~4000 Patient:Innen (Zeitraum 2002-2023)**

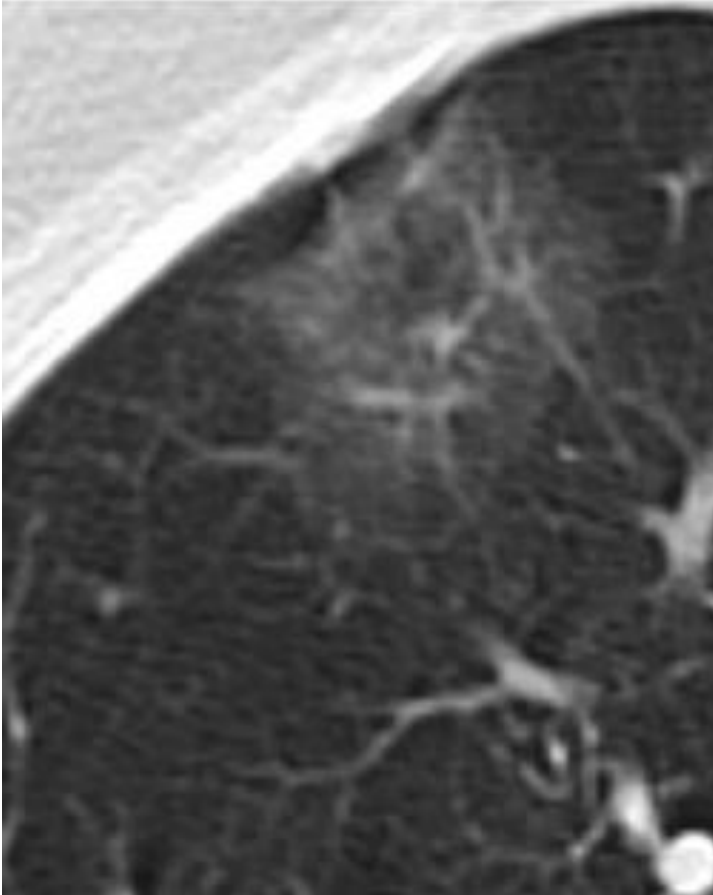


Bessere radiologische  
Risikostratifizierung?

## Pure GGN



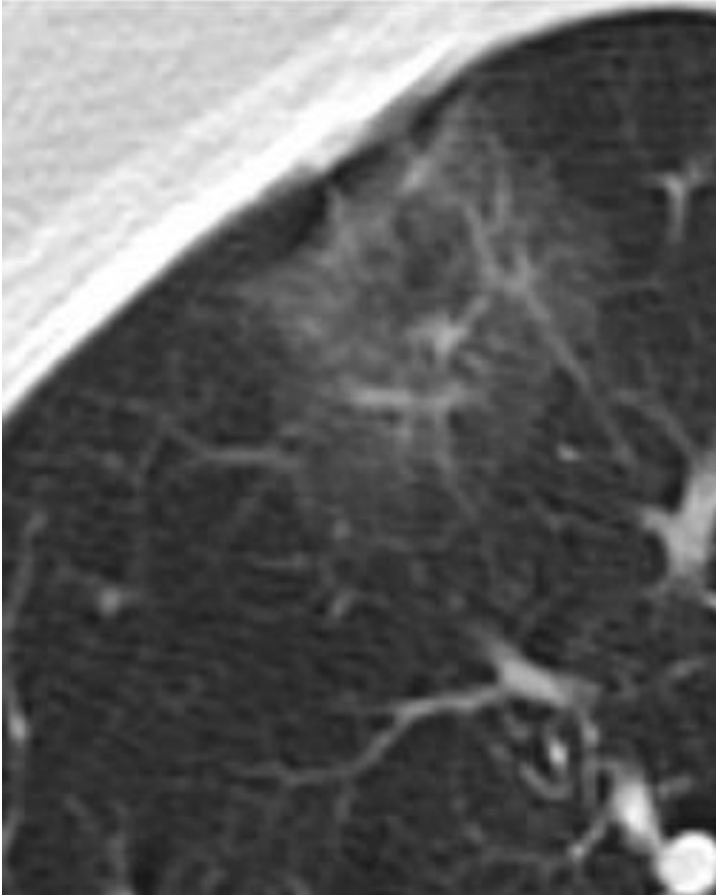
Pure GGN



Heterogenous GGN



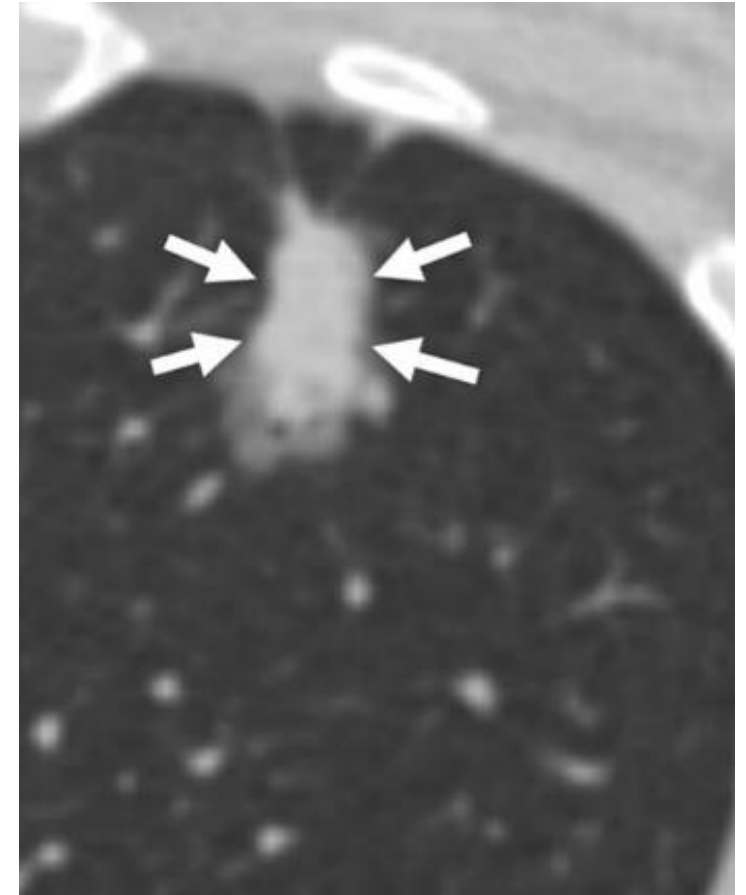
Pure GGN



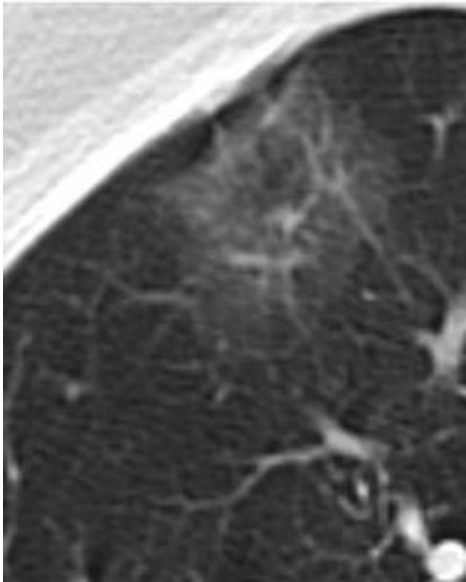
Heterogenous GGN



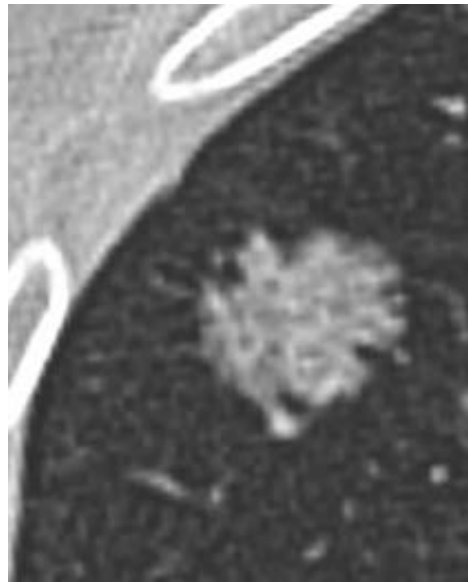
Part-solid nodule



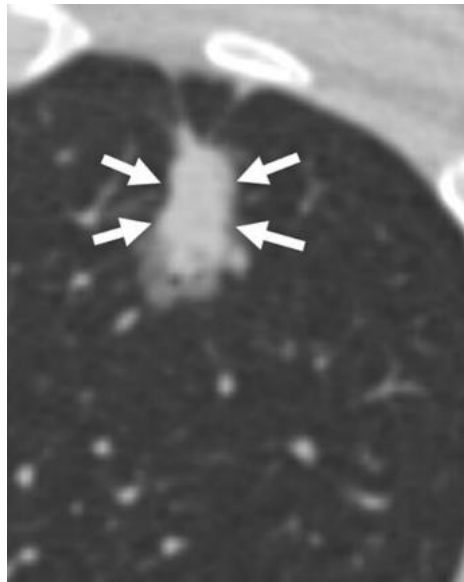
Pure GGN



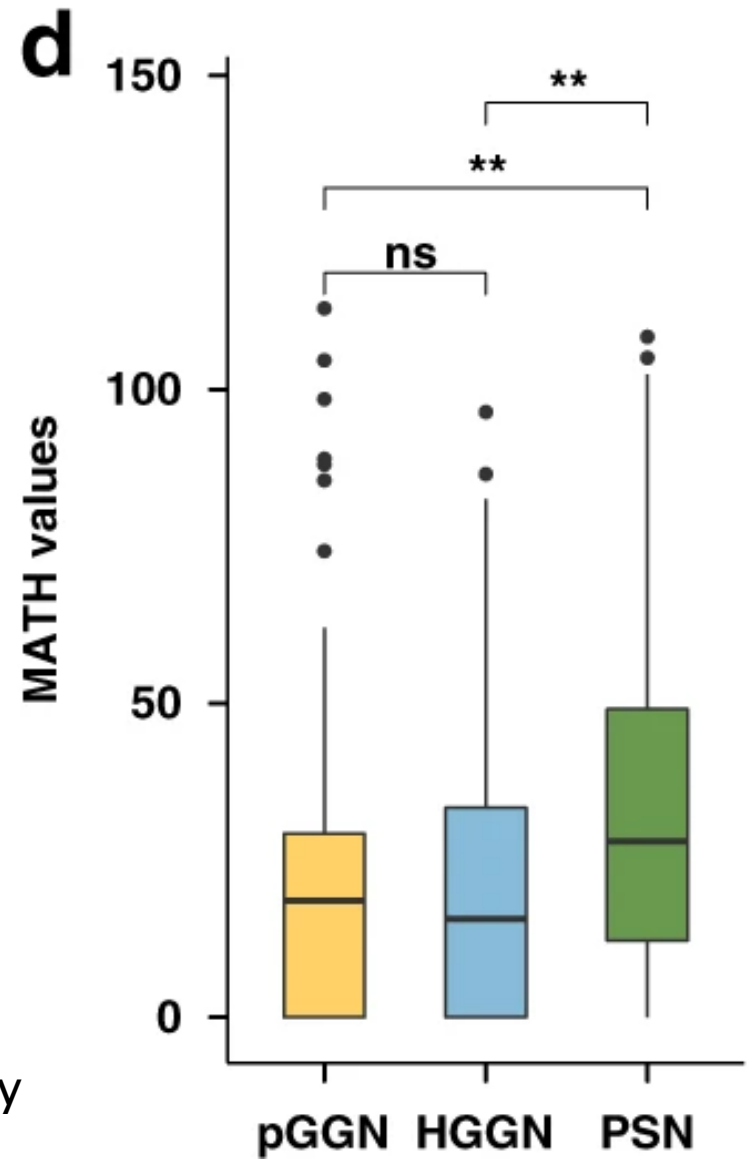
Heterogenous GGN



Part-solid nodule



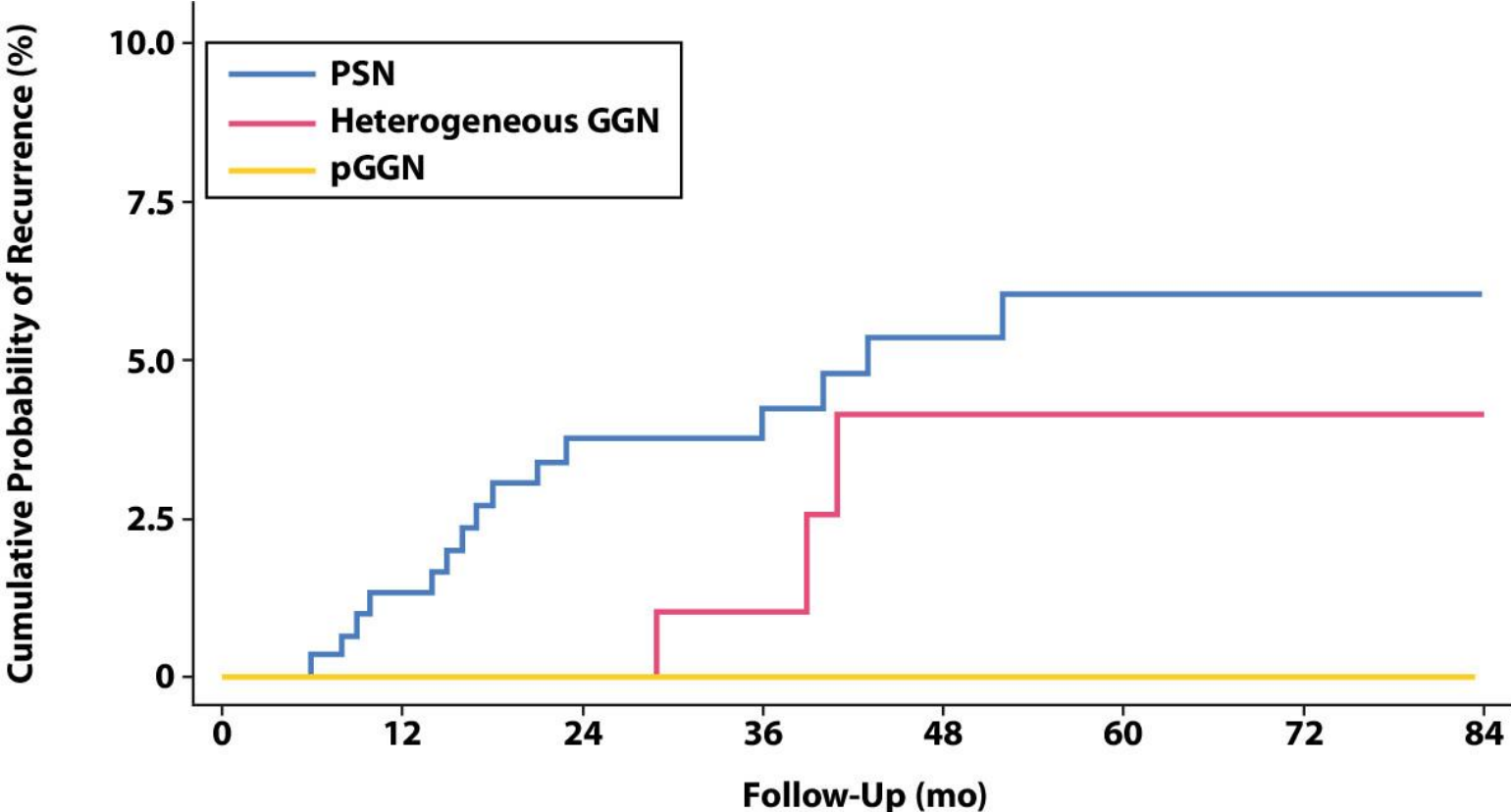
Mutant-allele tumour heterogeneity





	pGGNs (n=59)	Heterogenous GGNs (n=109)	PSNs (n=301)
Maximaldurchmesser im CT (cm)	1,45 (1,15-1,85)	1,7 (1,25-2,25)	1,9 (1,45-2,55)
Adenokarzinom in situ (Tis)	10 (17%)	5 (5%)	10 (3%)
T1 mi	26 (44%)	30(28%)	63(21%)
Invasives Adenokarzinom	<b>23 (39%)</b>	<b>74 (68%)</b>	<b>228 (76%)</b>
Durchmesser des invasiven Anteils in Pathologie in cm	0,3	0,7	1

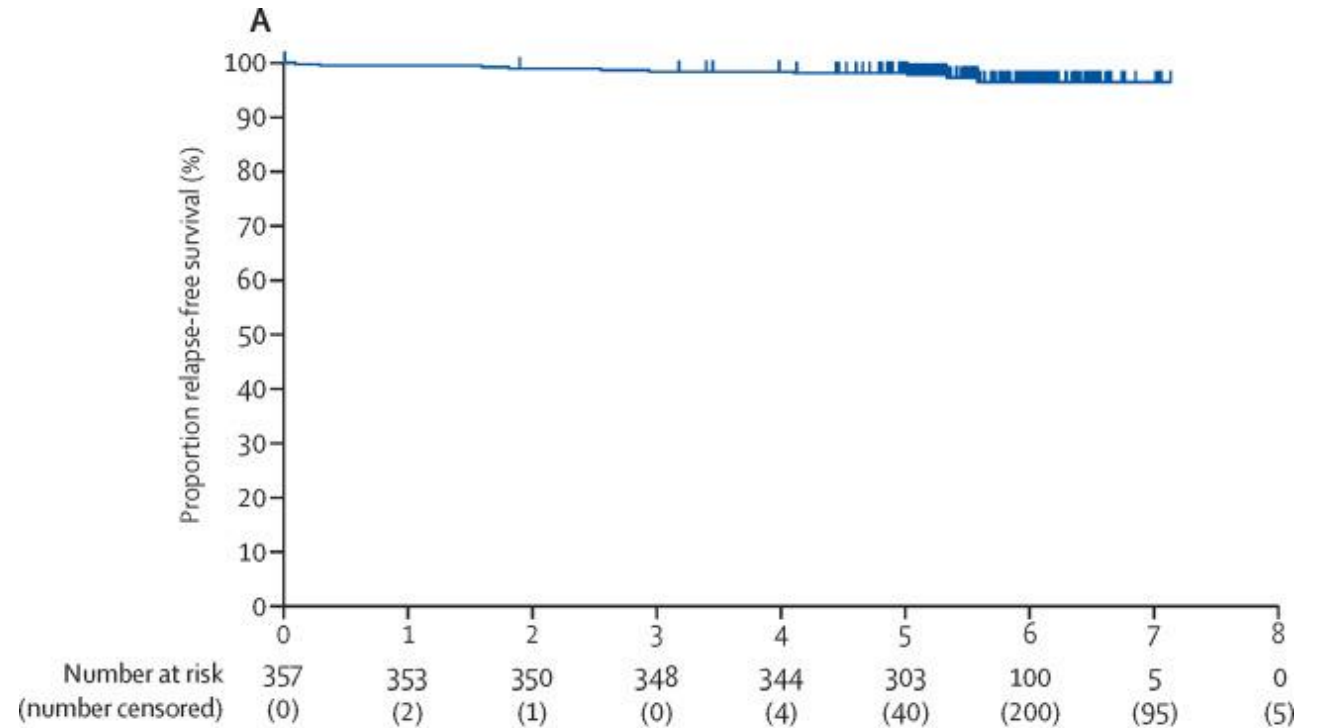
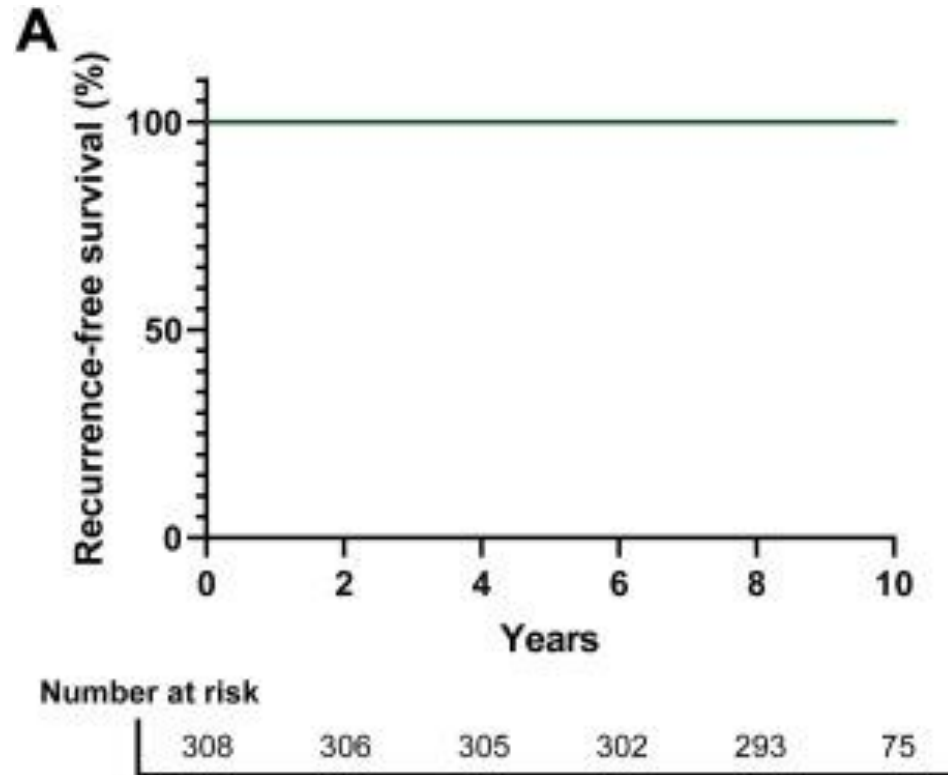
# Rezidivrisiko



**No. at risk**

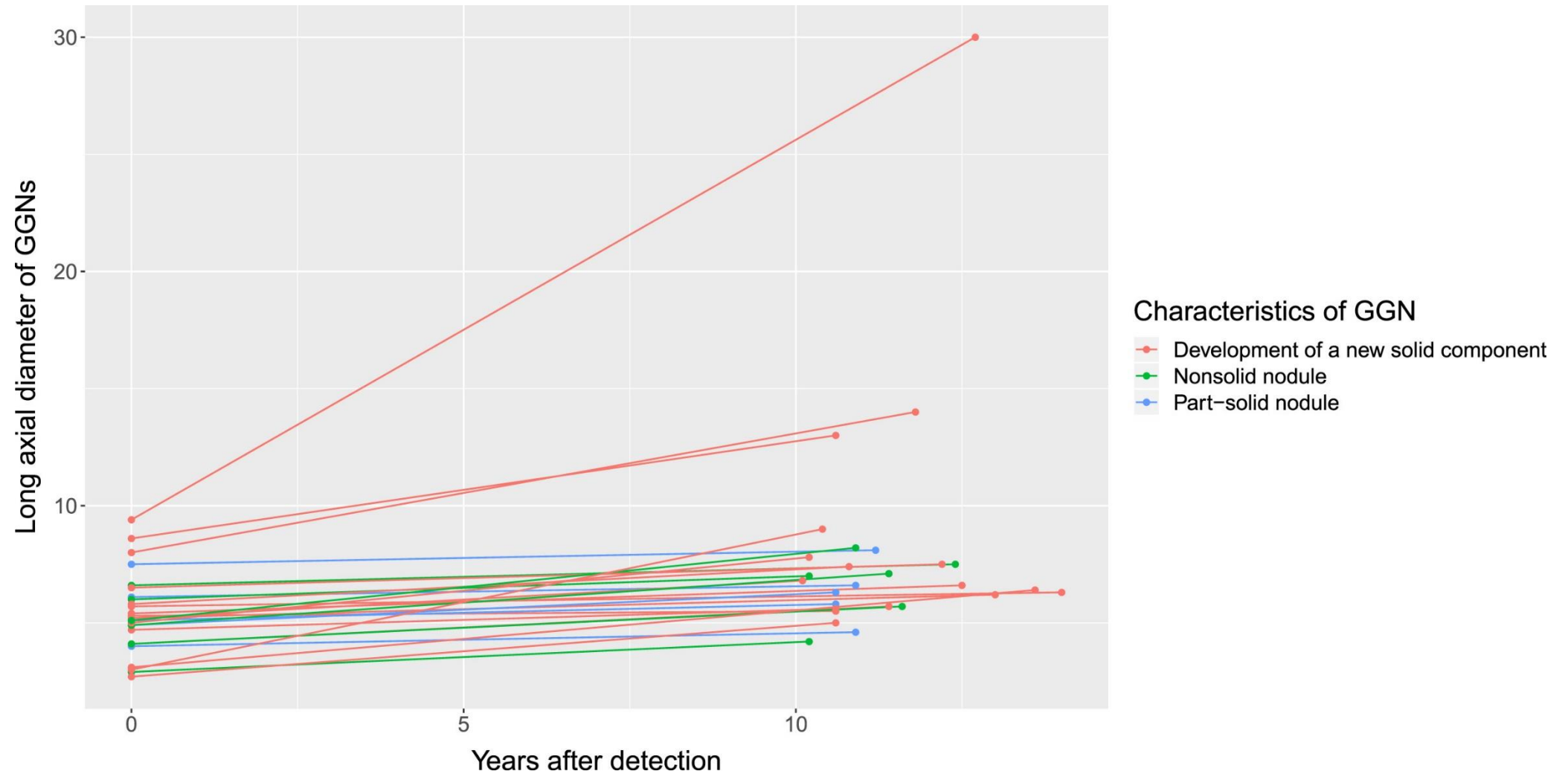
PSN	301	292	268	197	147	124	83	57
Heterogeneous GGN	109	107	101	71	49	45	33	20
pGGN	58	58	55	48	40	36	24	12

# Adenokarzinom (pure)GGO – Prognose nach Resektion

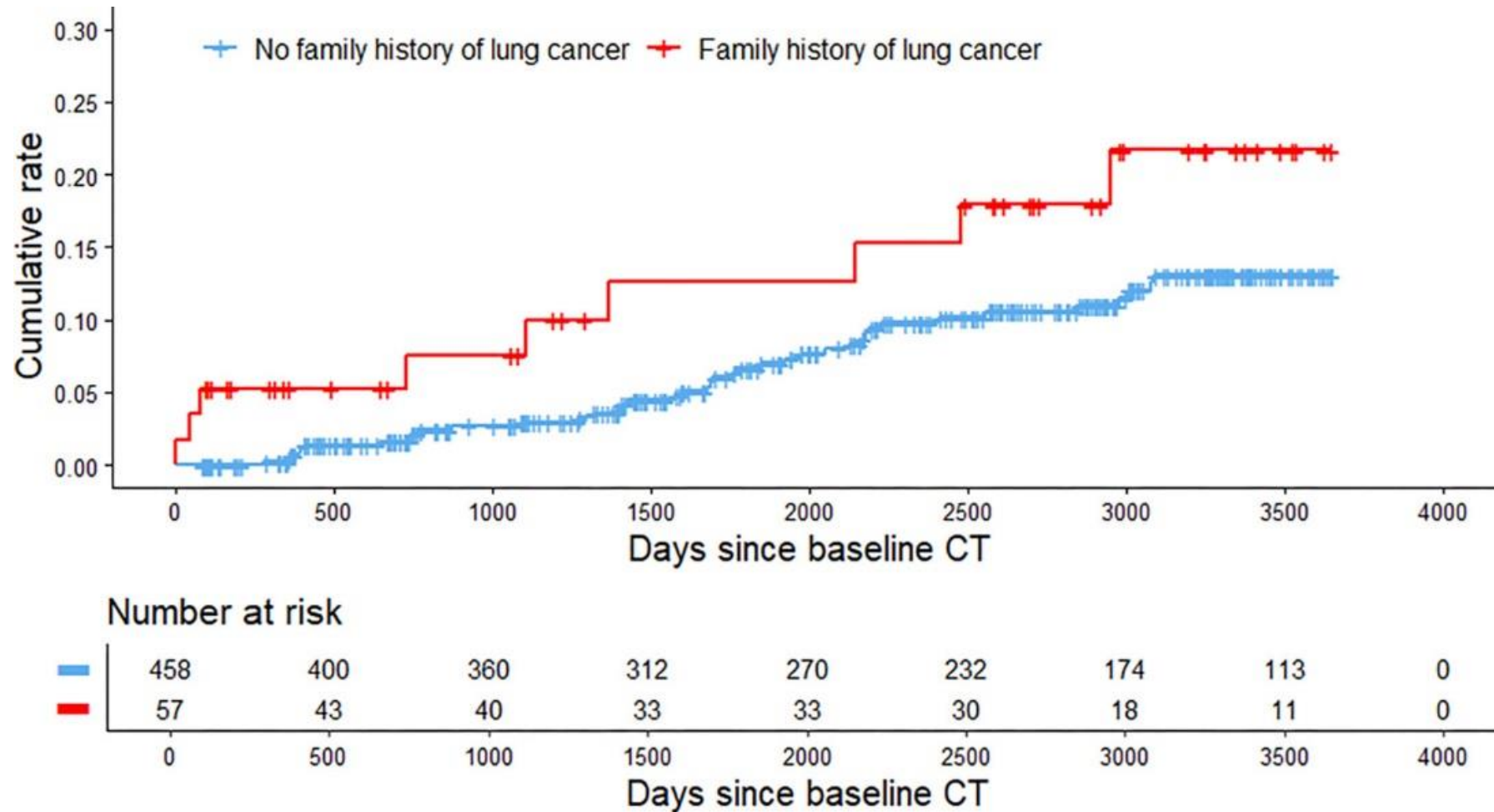


Segmentektomie GGO dominates  
Adenokarzinom <3cm

# Wachstumskinetik von GGN die 5 Jahre stabil waren



# Asiatische Nieraucherinnen – CT Screening Familienanamnese



# Take to Work Message

Persistierende Milchglasrundherde benötigen lange Verlaufskontrollen bis 5 Jahre!

# Leitlinien für Personen ohne onkologische Erkrankung

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## **Guidelines for Management of Incidental Pulmonary Nodules Detected on CT Images:** From the Fleischner Society 2017<sup>1</sup>

# Leitlinien für Personen ohne onkologische Erkrankung

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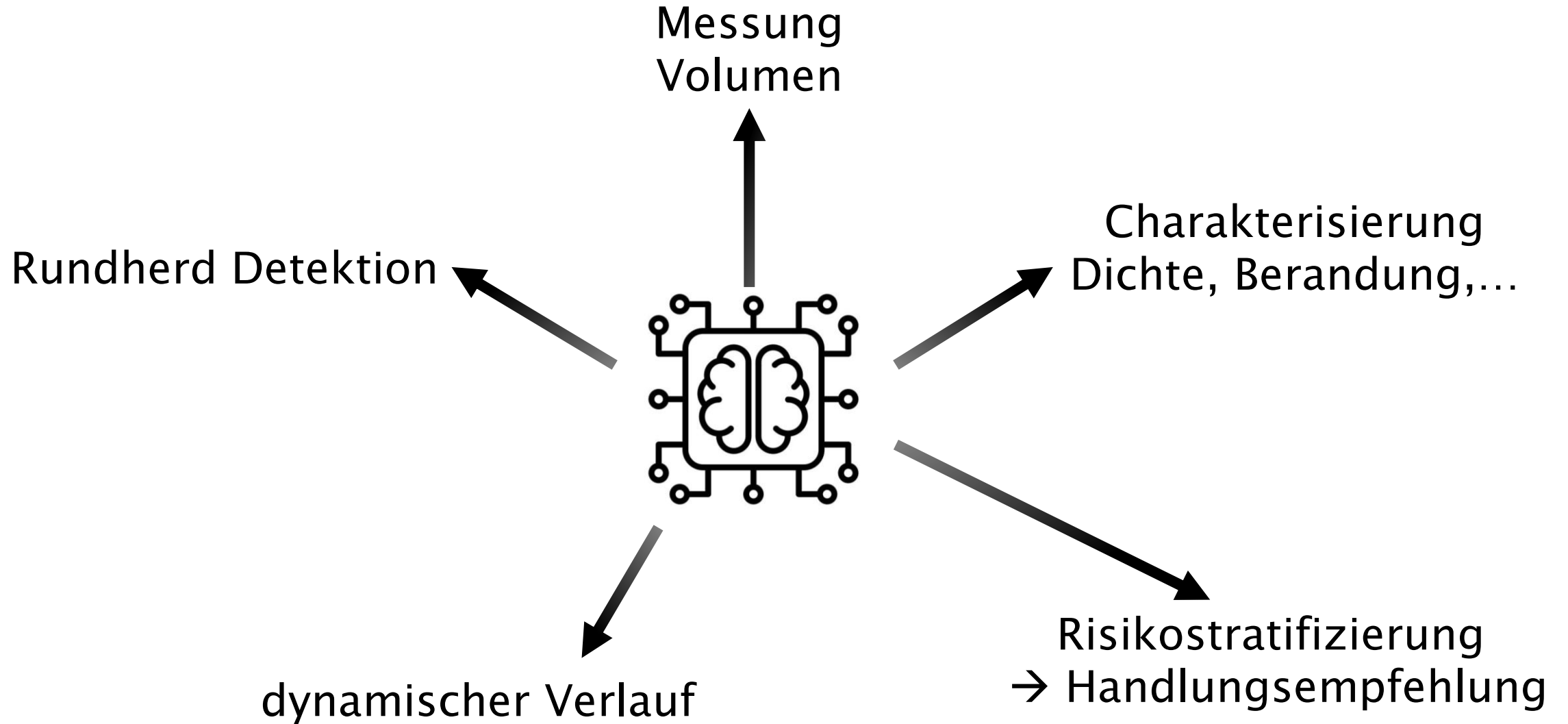
**Guidelines for Management of  
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**Lung-RADS® 2022**

**ACR®**  
AMERICAN COLLEGE OF  
RADIOLOGY

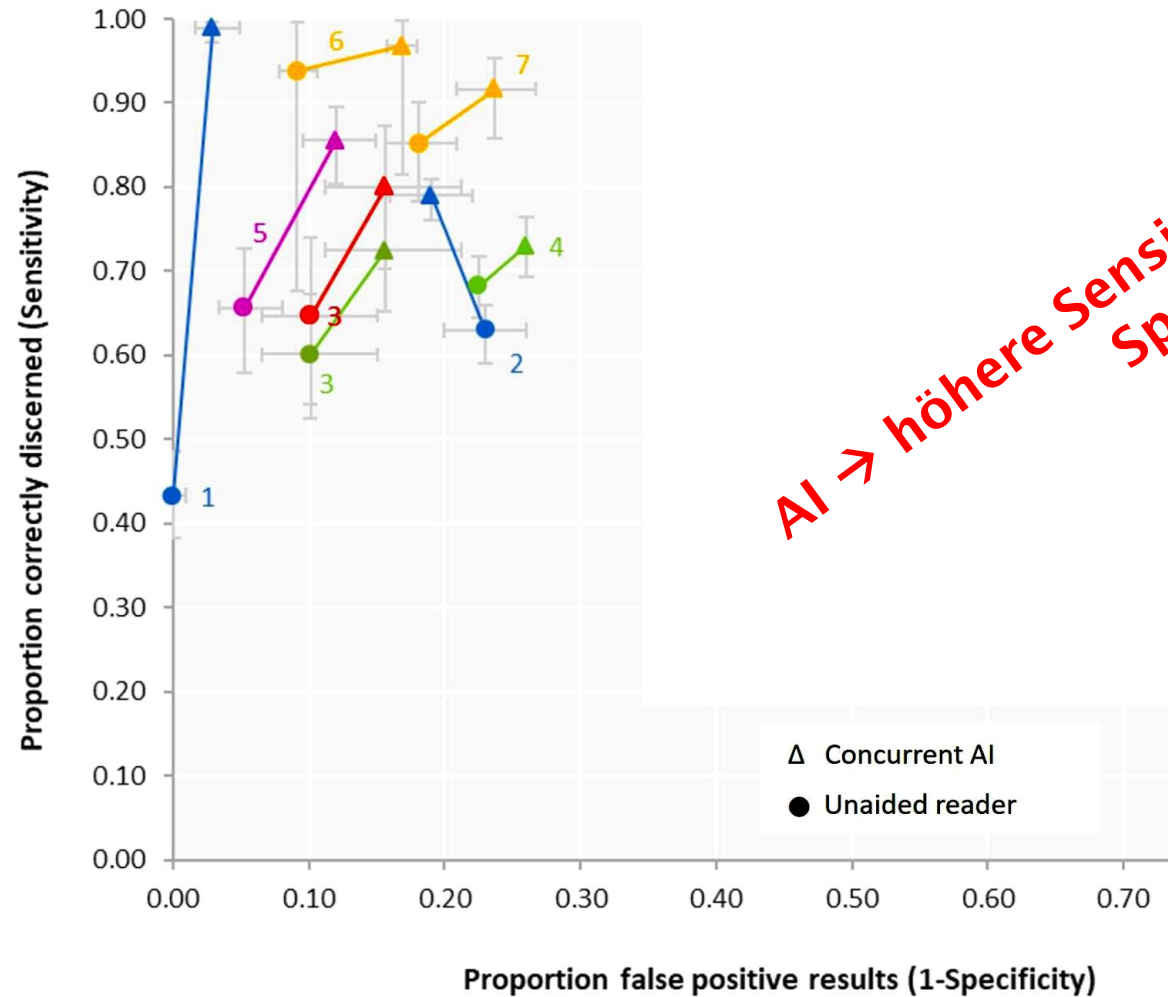
Release Date: November 2022



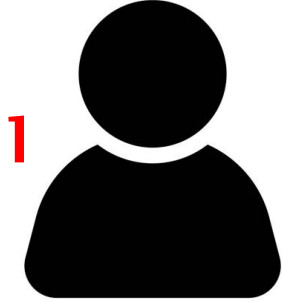


# Metaanalyse Lungenkarznom – AI (CE labelled)

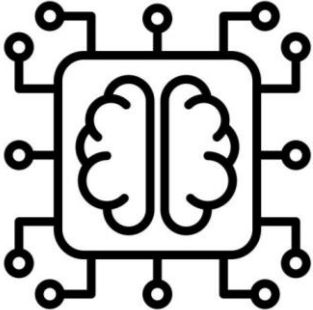
~20.000 Patient:Innen



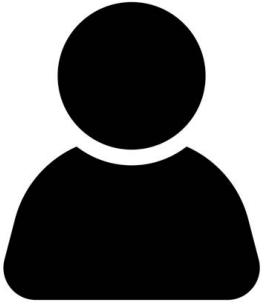
# Radiolog:Innen + AI



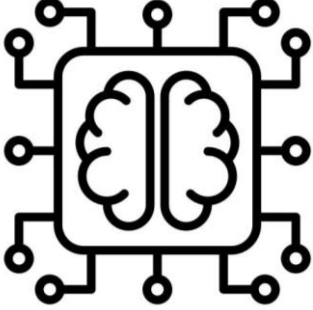
2



**Second reader**  
evt. Qualitätsverbesserung  
Keine Zeitersparnis



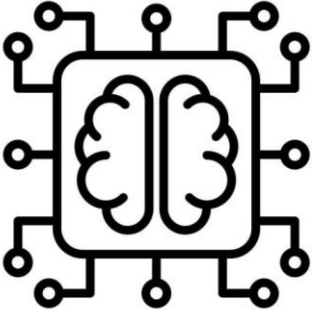
+



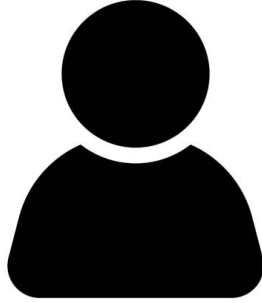
**Concurrent reader**  
evt. Qualitätsverbesserung  
evtl. Zeitersparnis



1



2



**First reader**  
evt. Qualitätsverbesserung  
evtl. Zeitersparnis

Vielen Dank!