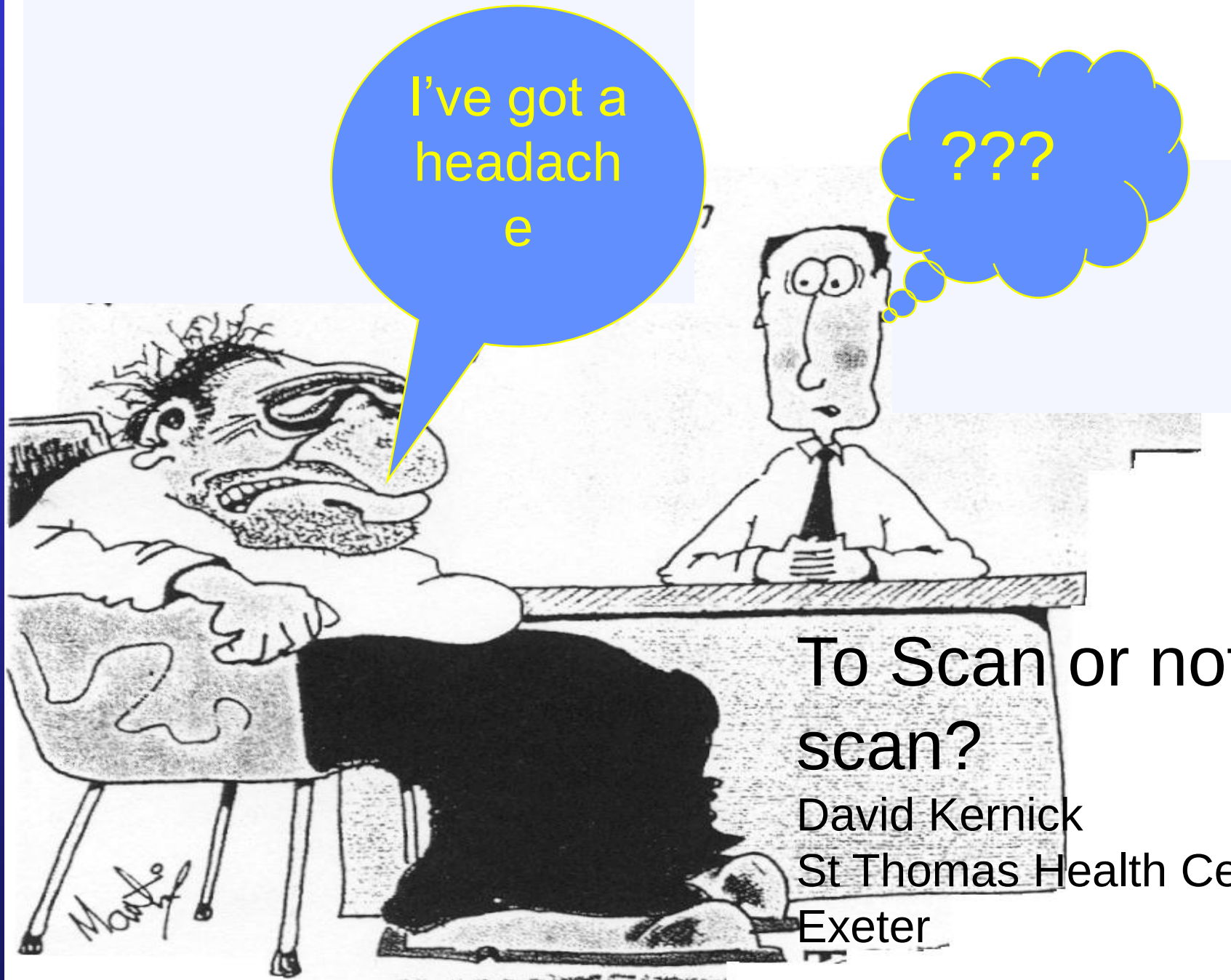


To Scan or not to scan?

David Kernick
St Thomas Health Centre
Exeter

Direct GP access to MRI

GPs can refer appropriately

Kernick BJGP 2011

What do people think they present with headache?

- I need glasses
- Its my blood pressure.
- I have a tumour.

What should GPs think when patients present with headache?

- Malignancy – primary/secondary?
- Structural problem?
- Benign space occupying lesion – AV malformation, cyst.

Primary Tumours

- Meningioma 20% - 10 yr survival 80%
- Glioma 70% - 5yr survival 20%
- Misc. 10% - Variable

Headache and tumour

- Headache prevalence with tumour 70%+
- Headache at presentation 50%
- Headache alone at presentation 10%

(Iverson 1987)

Population 100,000 adults each year: 10 primary brain tumours

- 220,000 headaches
- 4,000 GP consultations for headache
- 200 Secondary care consultations - 50% scanned (Laughey 1999, Elrington 2003)
- 100 Intermediate care consultations – 4% scanned (Kernick 2004)

Population 100,000 adults each year:

- 220,000 headaches
- 1 tumour will present as isolated headache

Risk of brain tumour with headache presenting to primary care (Kernick 2008)

	Risk %	
	Undifferentiated headache	Primary headache
Under 50	0.09%	0.03%
Over 50	0.28%	0.09%

Why scan?
The advantages:

- Allay anxiety - reassurance if negative

- Better management - improved quantity and quality of life if positive

Are investigations Anxyiolytic?

- RCT of 150 patients with CDH
- Short term reduction in HAD score at 3 months but not maintained to 1 year

Howard 2005

Why not scan everyone with headache? The disadvantages

- Resource implications
- Exposure radiation with CAT scan
- Exposes incidental abnormalities

Headache population 0.6- 10%

Population average 2.7%

Luftwaffe pilots (n-2370) Weber 2006

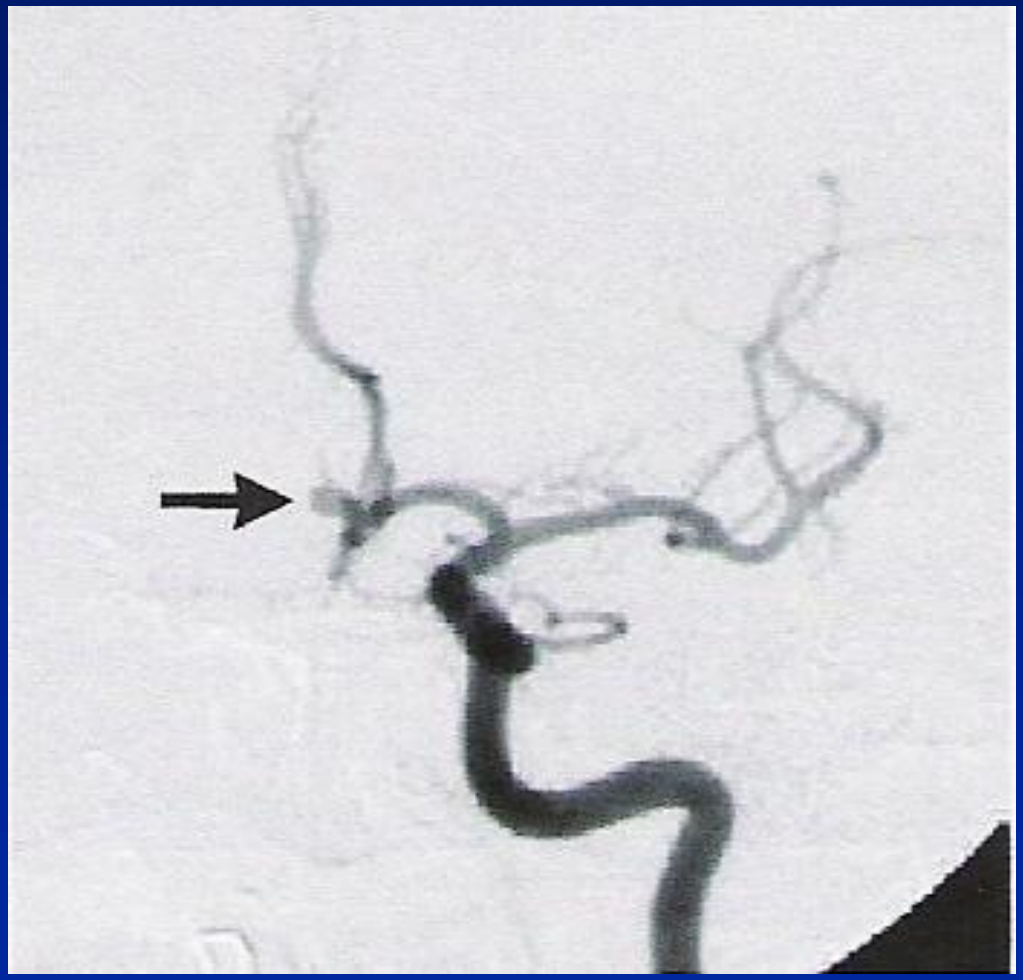
- 93% normal
- Of the normal images, 25% were variations of the norm
- 6.7% abnormalities (n-166)
- Most common: 56 cysts; 13 vascular abnormalities;4 adenomas; 4 tumours

A 45 year old nurse with a long history of migraine getting more frequent

VOMIT syndrome

Hayward 2003

MRI scan revealed a 5mm aneurysm



Chances of rupture over a five year period

Wiebers Lancet 2003

Size of aneurysm	Five year rupture rate %	
	A	B
<7mm	0	2.5
8-12mm	2.6	14.5
13-24 mm	14.5	18.4
>25mm	40.0	50.0

A = internal carotid, ant. communicating, ant/middle cerebral artery

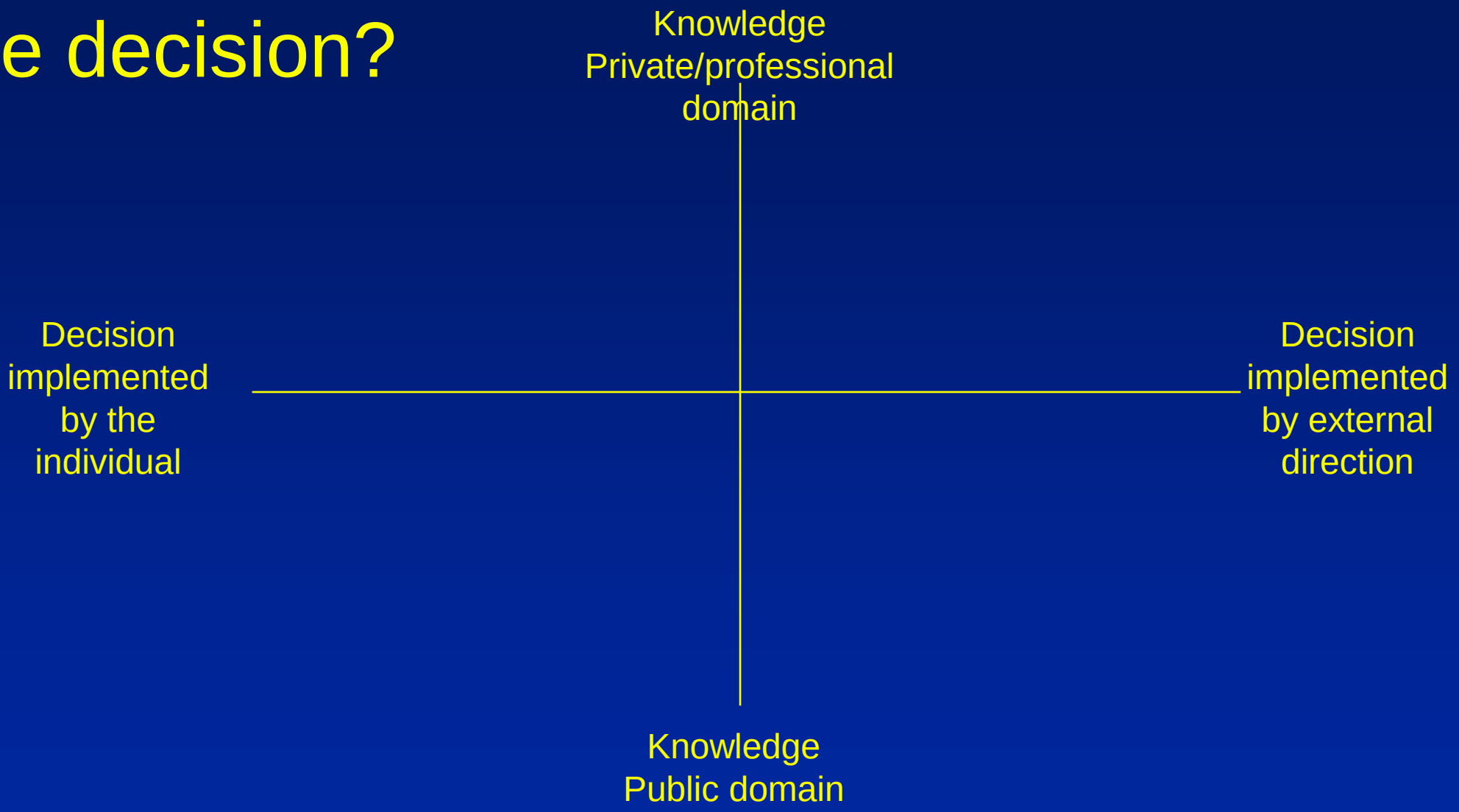
B = post circulating, post. communicating artery

We need to scan when the advantages out way the disadvantages

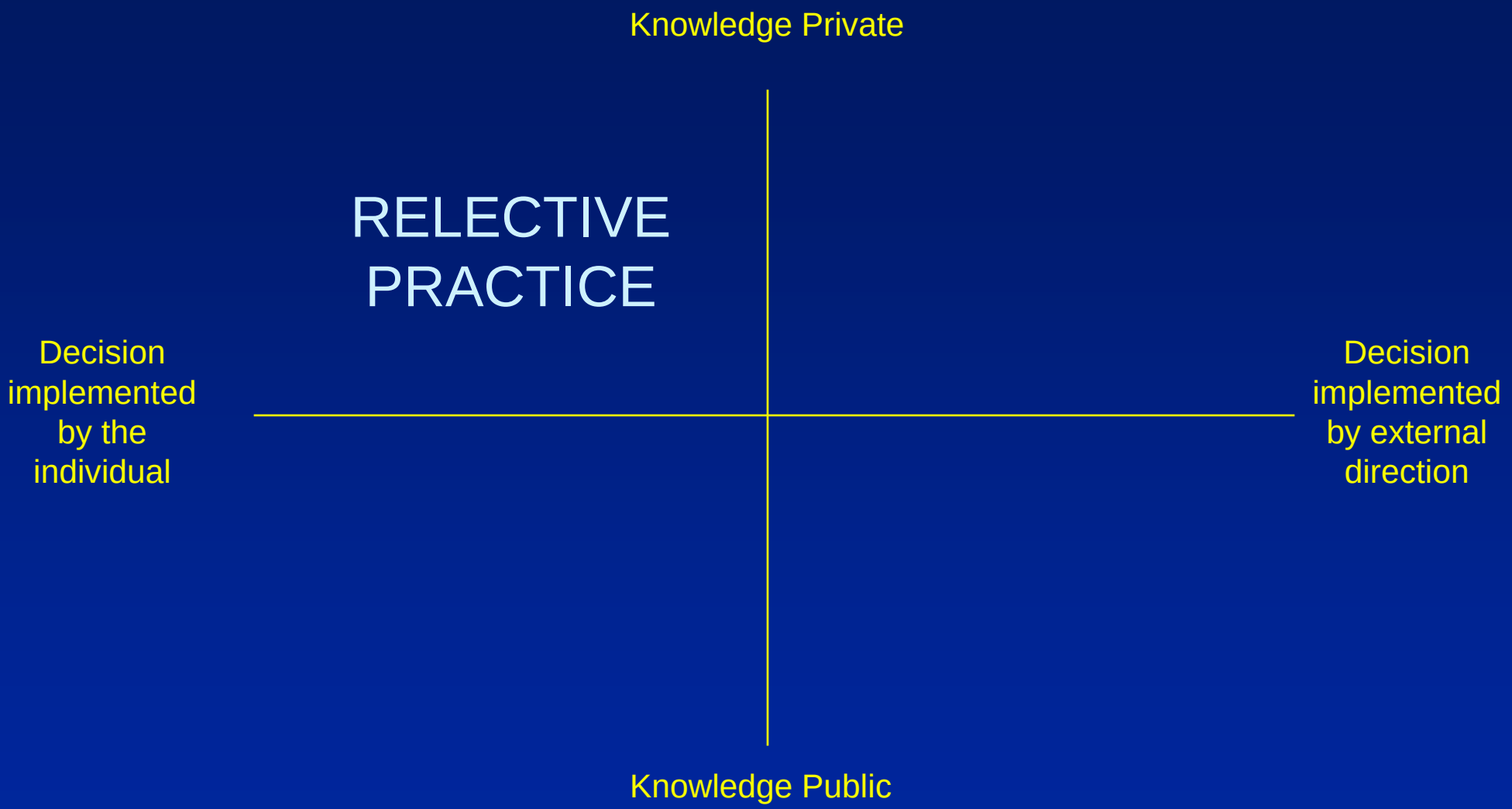
Reassurance, treatment

Cost, exposure incidental pathology

How do we make the decision?



The derivation and application of knowledge (after Harrison)



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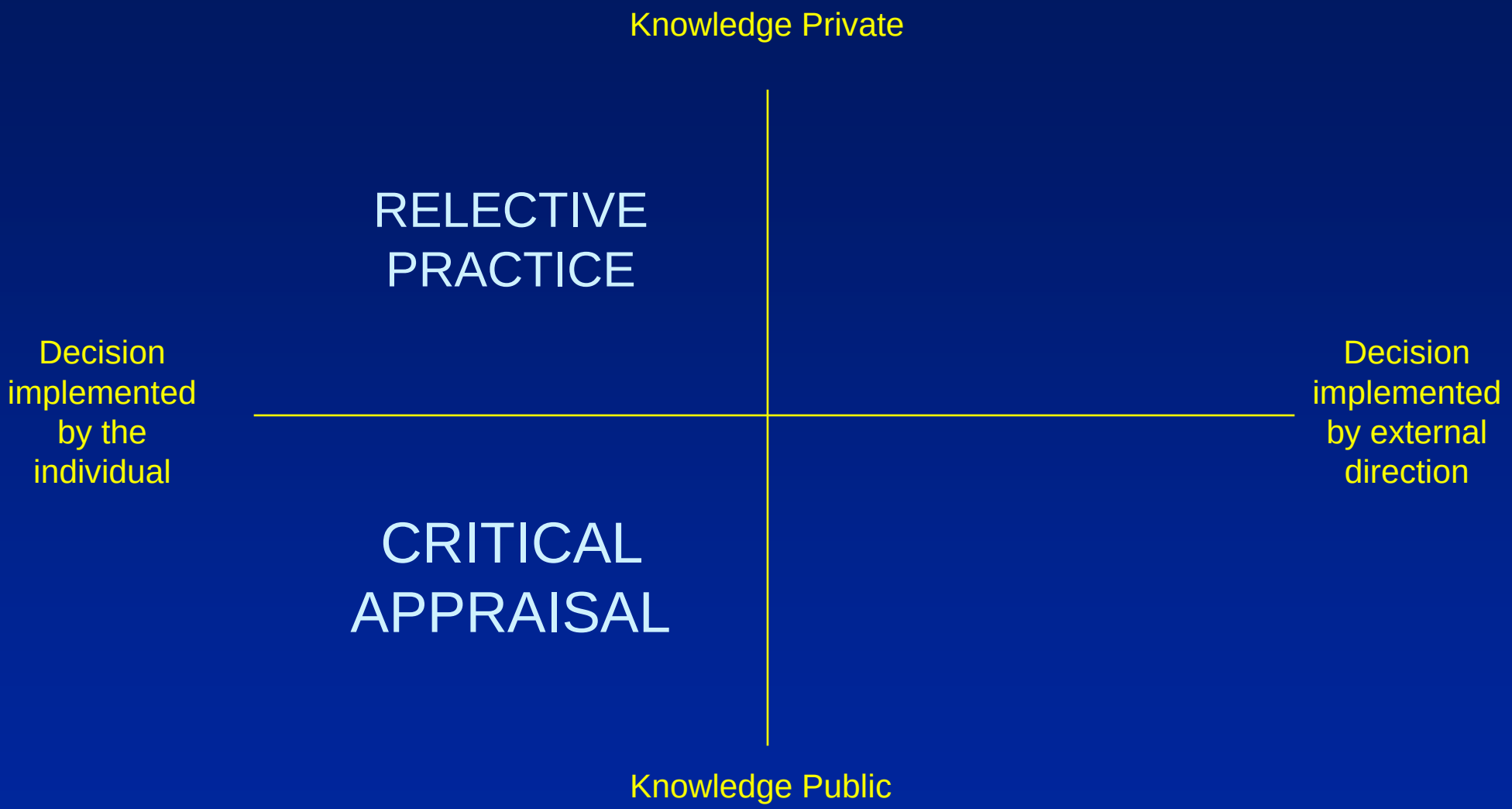

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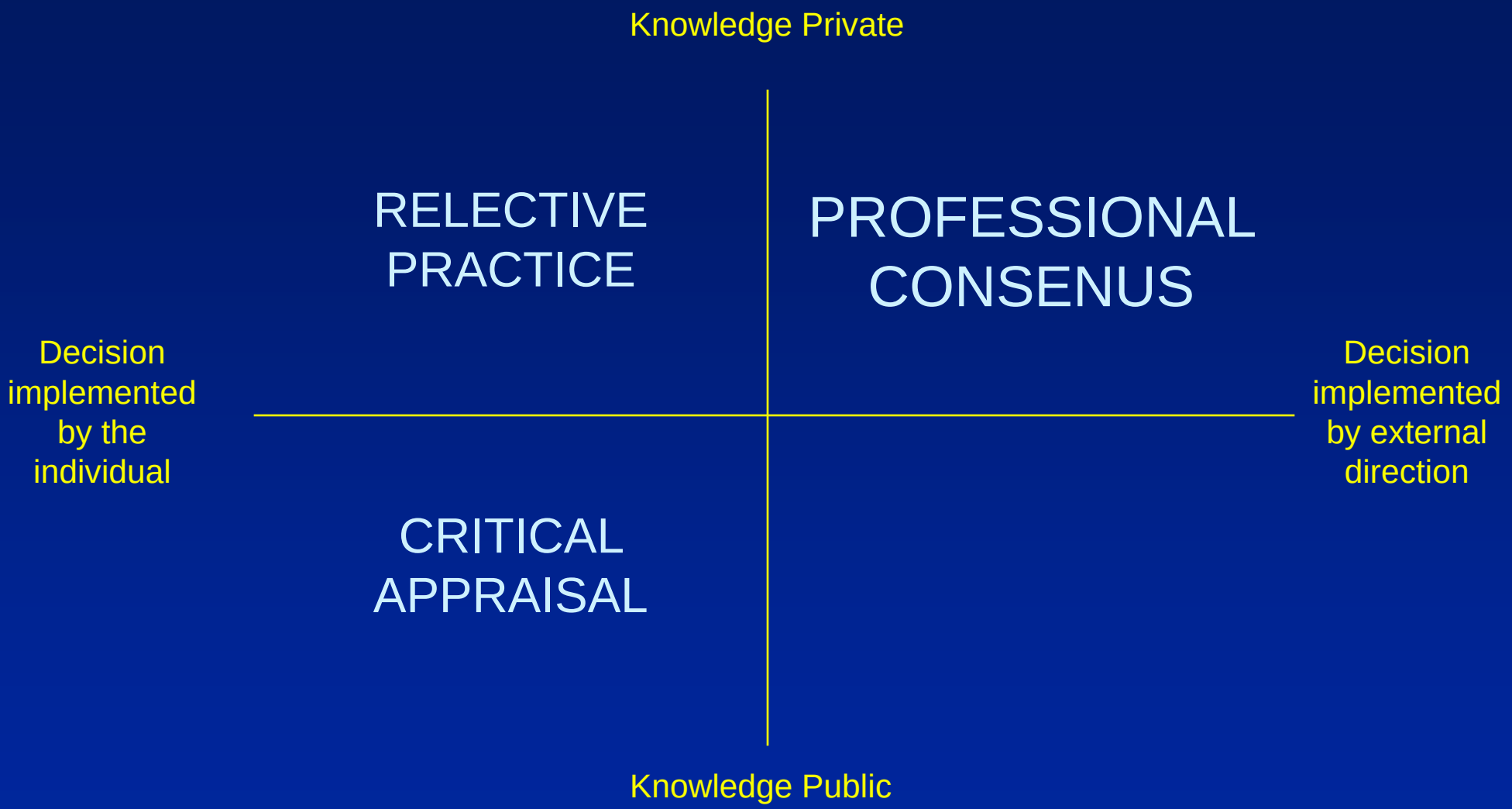

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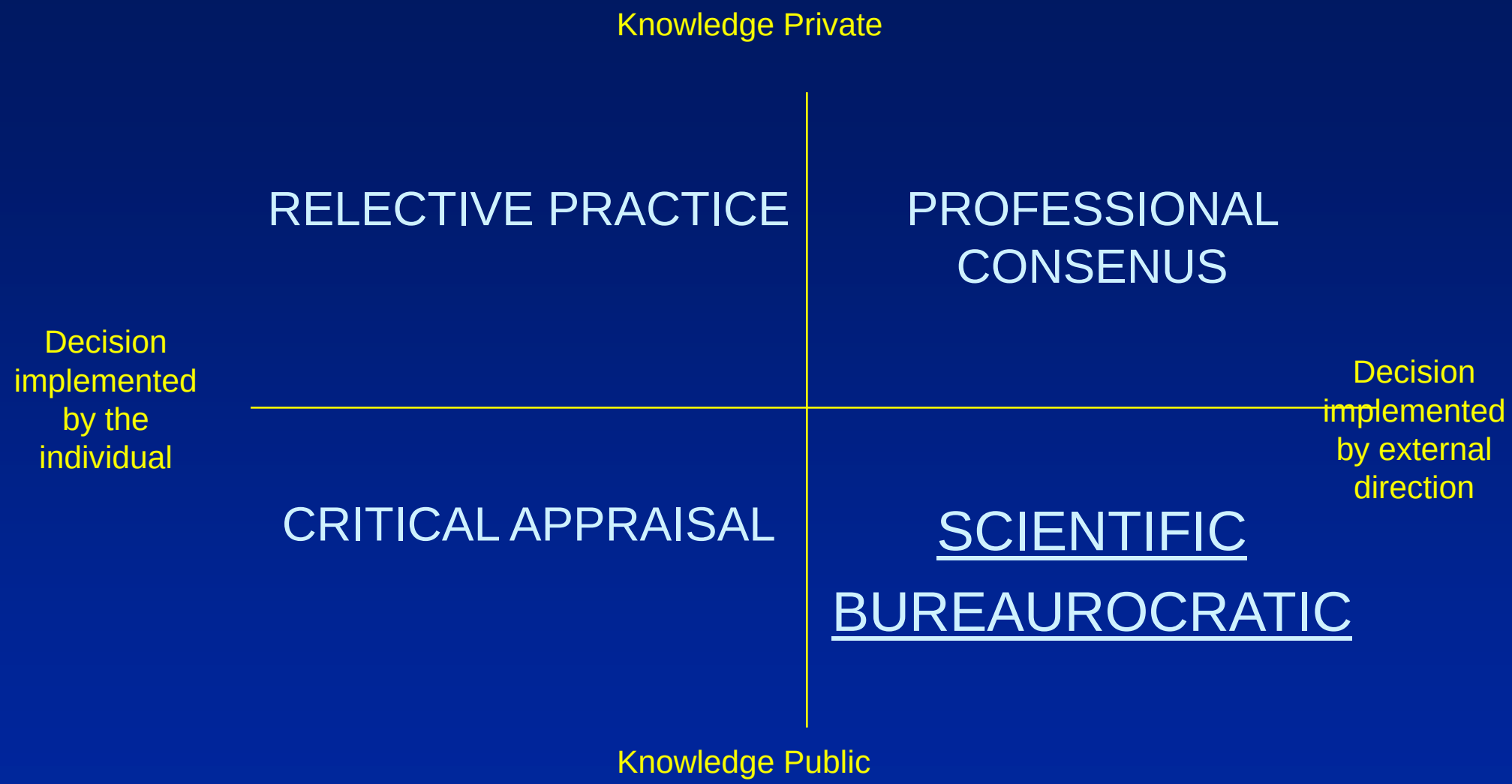

Knowledge Private
RELECTIVE PRACTICE
PROFESSIONAL CONSENUS
Decision implemented by the individual
Decision implemented by external direction
CRITICAL APPRAISAL
SCIENTIFIC
BUREAUROCRATIC
Knowledge Public

Scientific Bureaucratic approach
Two key questions

1 - At what risk should patients be imaged for tumour?

Risk of tumour with headache	Cost per QALY
0.4%	£581,000
4%	£66,000

- NICE – prepared to recommend up to £20,000/QALY supported by good evidence

Medina 2001

At what level of risk should we investigate – what do we do in other areas?

- Risks for carcinoma colon:
- Weight loss 1.2%
- rectal bleeding 2.4%

- Risks carcinoma lung: haemoptasis 2.4%

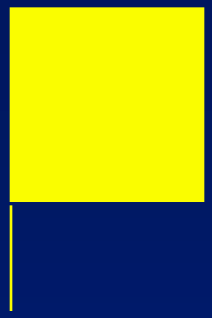
Red Flags

Probability of significant morbidity or mortality >1%.

Need urgent investigation

Orange Flags

Headache presentations where probability is likely to be 0.1% and 1%. Need careful monitoring and low threshold for imaging



Yellow Flags

Probability of underlying morbidity or mortality is <0.1%.

Needs appropriate management and follow up

there are no green flags

Scientific bureaurocratic approach
Two key questions

1 - At what risk should patients be imaged for tumour?

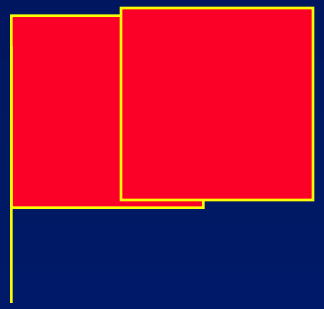
2 - What symptoms or signs indicate a level of risk of tumour?

Problems with the Evidence Base

- Poor methodology – no prospective RCTs
- Acute conflated with non-acute
- Imaging sensitivity changes
- Small sample sizes and wide range of estimates
- All studies in secondary care

Probabilities

Associated Feature	Probability (some very wide CI)
Awakes from sleep	5%
New seizure	1.2%
Cluster type	1%
Rapidly increasing frequently	1%
Worse with Valsalva	0.3%
Headache with vomiting	0.2%
Isolated Confusion	0.2%
Isolated Memory loss	0.036%



Red Flags +

Do something now

- Sub-arachnoid?
- Temporal Ateritis
- Meningitis
- Carbon Monoxide

Red Flags

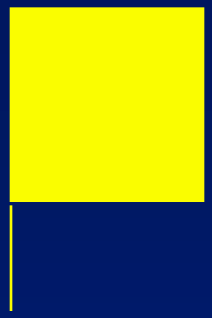
Probability of significant morbidity or mortality >1%.
Need urgent investigation.
Headache with:

- Abnormal neurological symptoms or signs
- New seizure
- With exercise
- History of cancer elsewhere
- (New cluster type headache)

Orange Flags

Headache presentations where probability is likely to be 0.1% and 1%. Need careful monitoring and low threshold for imaging

- Aggregated by Valsalva manoeuvre
- Headache with significant change in character
- Awakes from sleep
- New headache over 50 years
- Memory loss
- Personality change
- *If a primary headache diagnosis has not emerged in an isolated headache after 8 weeks*



Yellow Flags

Probability of underlying morbidity or mortality is <0.1%. Needs appropriate management and follow up – there are no green flags

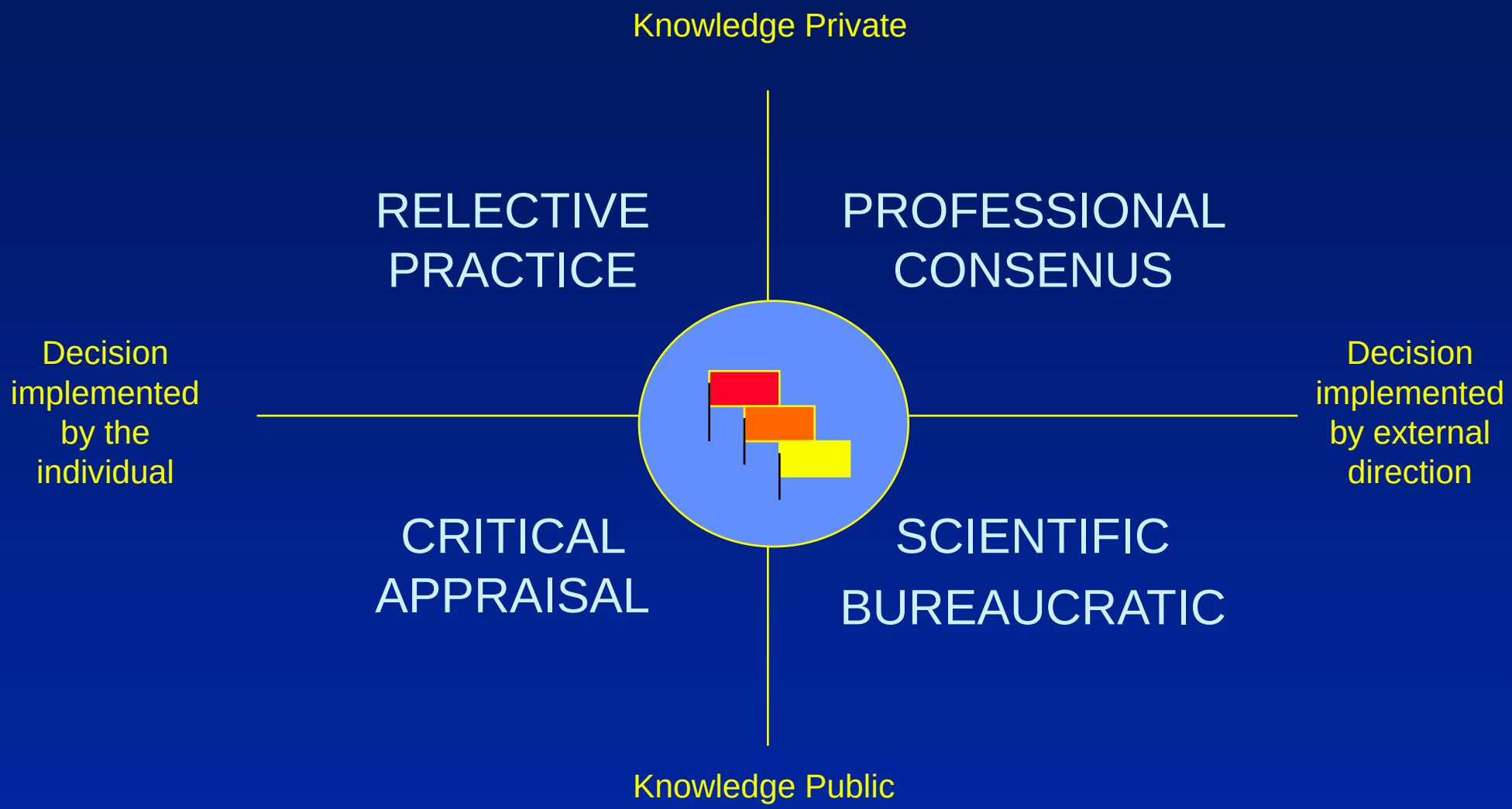
- Diagnosis of migraine or tension type headache

Who to refer in children?

- Population rate tumour 3/100,000
- GPs don’t diagnose 80%, refer 25%
- Risk of tumour with headache presentation is 0.03%
- Isolated headache 40%
- Early referral improves outcomes
- Incidental abnormalities 4-20%

Red/orange flags in children

- Wakes from sleep or on waking
- Persistent headache in young children
- Unilateral pain
- Occipital pain
- Headache with deteriation in school work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In conclusion – to scan or not to scan?

- No simple answer
- Think carefully why you are doing it
- Medico-legally. Can't go wrong with a simple examination with good record keeping
- If in doubt, follow patient up
- The exclusion of serious pathology does not exclude adequate management of a primary headache!


All this uncertainty gives me a headache
" I'm sorry to hear that, doctor!"