Early diagnosis of brain tumours in childhood

Colin Kennedy

University of Southampton

HEADSMART
be brain tumour aware

Some statistics

HEADSMART
be brain tumour aware

- One quarter of all childhood cancers occur in the brain
- Brain tumours kill more children and young people than leukaemia
- It takes longer for brain tumours to be diagnosed in the UK than in many other countries
- Early detection of brain tumours can improve outcomes
  - saving lives and reducing long-term disability

Challenges in diagnosing childhood brain tumours

- Relatively rare
  - GPs will typically see only one, maybe two, in their whole career
- Initial symptoms mimic common, less serious illnesses
- Varied presentation
- Fluctuate in severity
- Differ according to tumour location and developmental stage of the child

The presenting features of brain tumours: a review of 200 Southampton cases

Wilne SH, Ferris R, Nathwani* A, Kennedy CR.

Archives of Disease in Childhood, 2006, 91:502-06.

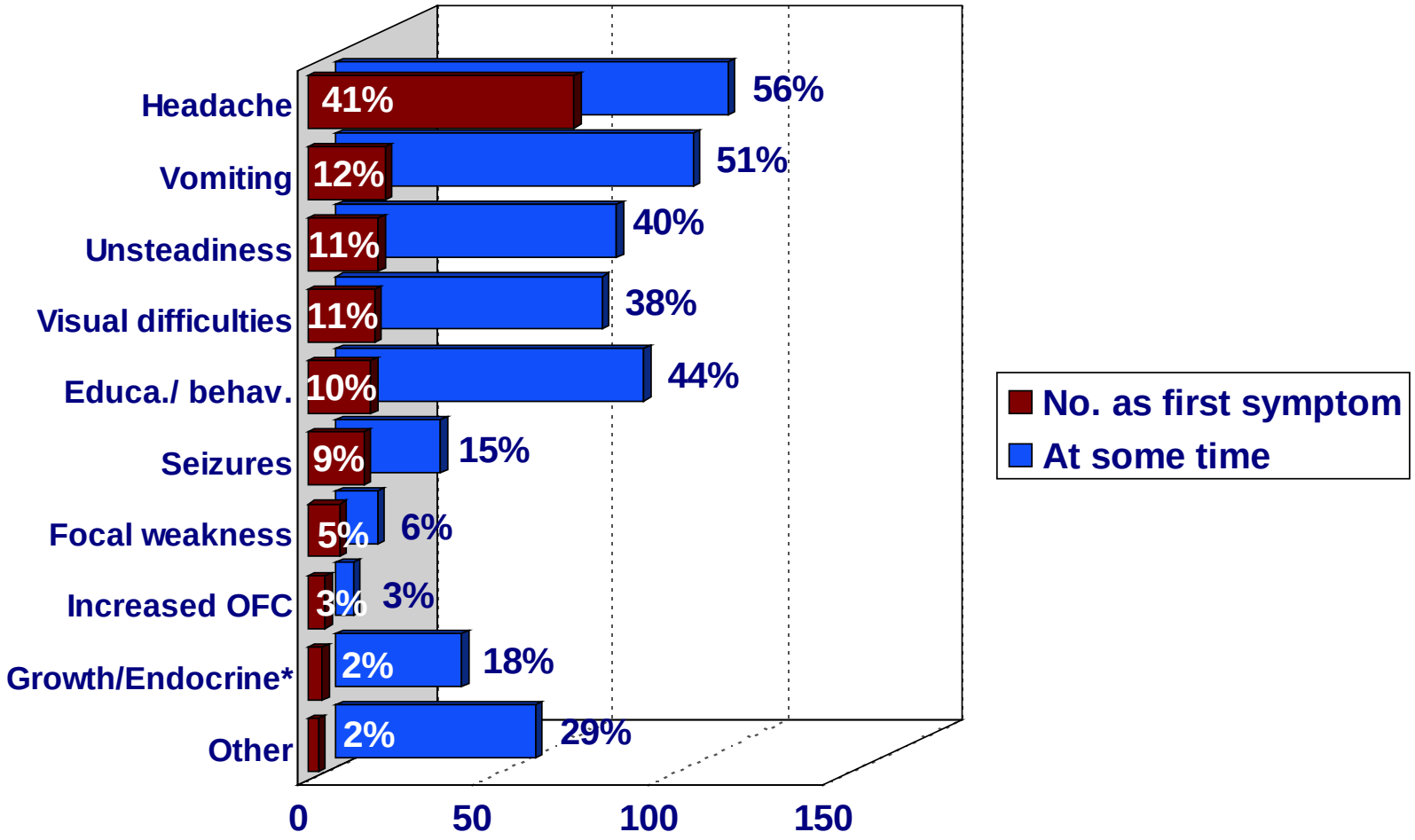
Methods

- Consecutive admissions to tertiary referral centre in UK
- Retrospective analysis of hospital notes
- Discharge diagnosis of CNS tumour
- >14 year period (Jan 1987 to June 2001)
- 9 symptom complexes

Results

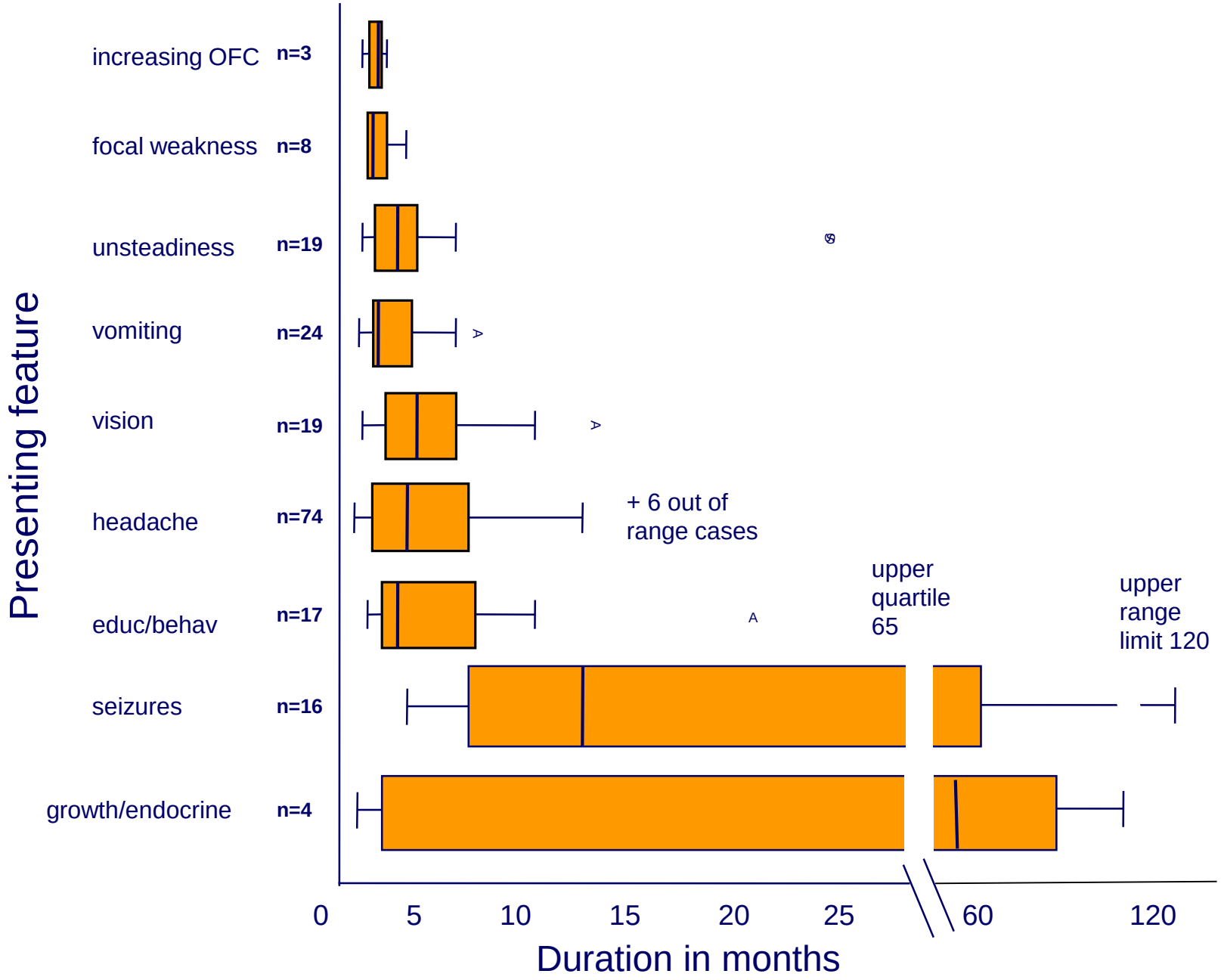
- 204 sets of notes reviewed
- 200 eligible patients
- Age range 15wks – 17yr (mean 7.4yrs)
- Gender 86 F: 114 M (3:4)
- Brain tumour + other diagnosis – 8%
  - 6 NF1, 1 NF2, 1 JCA, 2 TS,1 DMD, 3 shunts, 2 SLD
- Hydrocephalus at presentation – 43%

Relative frequency of symptoms in 200 children with brain tumours



* Includes symptoms of weight loss

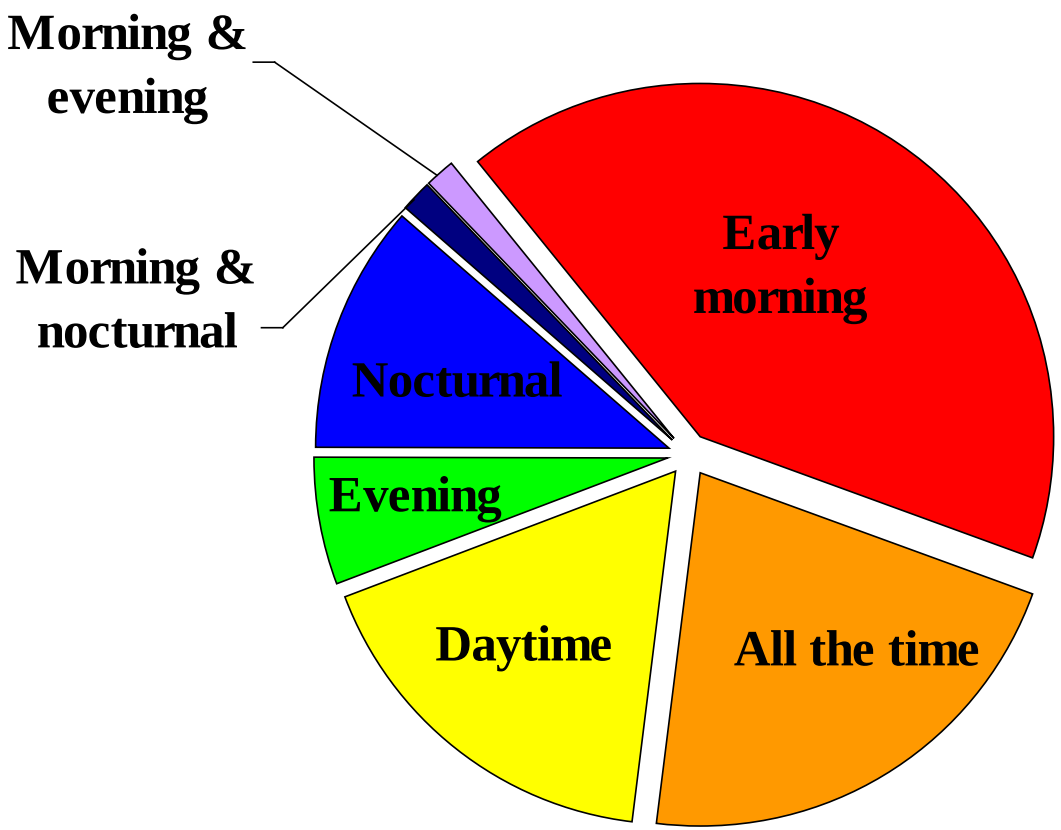
Duration of symptoms (months)



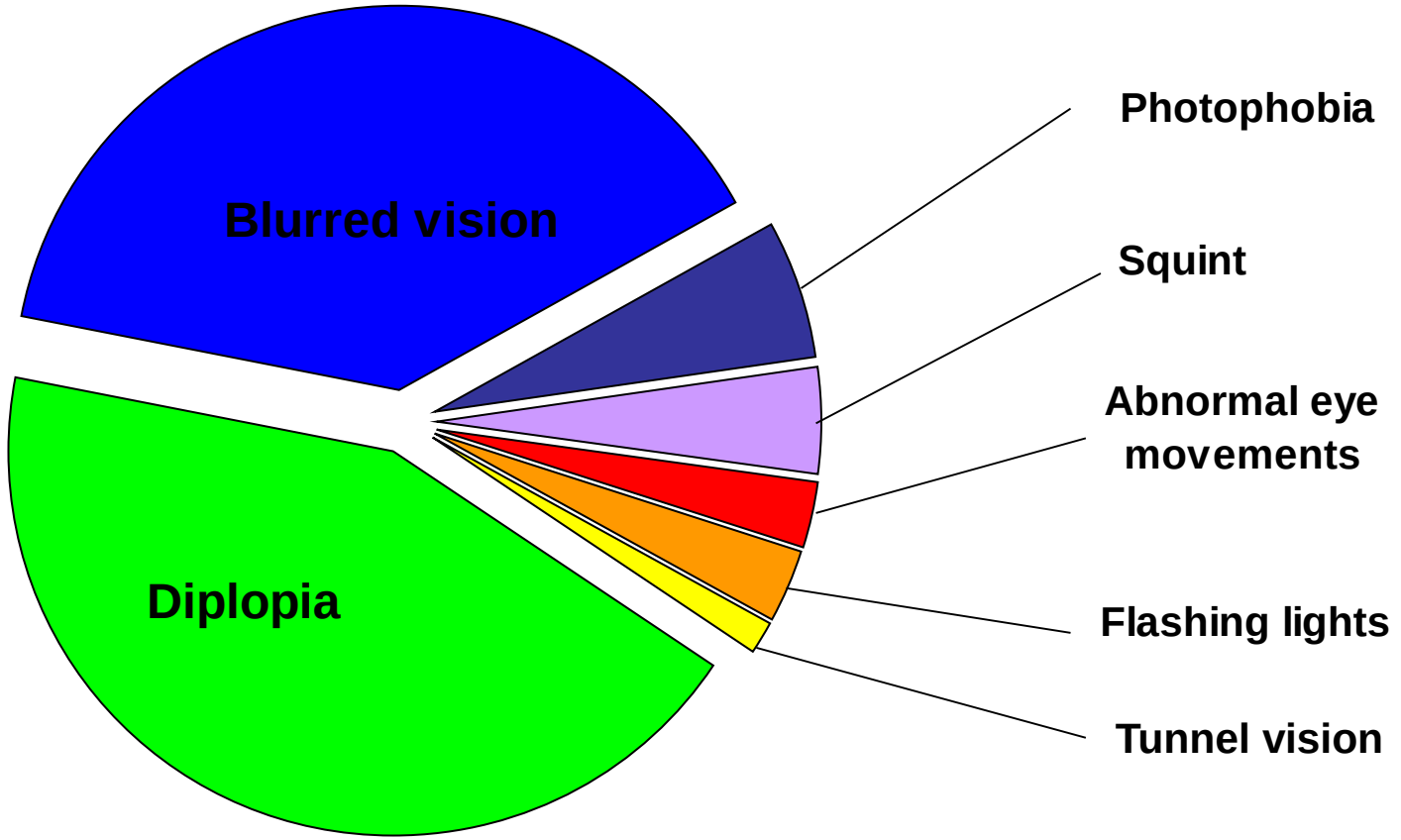
Factors associated with a median symptom interval of less than the median duration.

Variable	n	Odds Ratio of less than average symptom interval	95% CIs for Odds Ratio	P value
Univariate analysis				
Infratentorial location	94	2.33	1.24 to 4.37	0.009
Posterior fossa tumour	94	3.67	1.39 to 9.71	0.009
High grade tumour	73	5.13	2.62 to 10.00	<0.001
Age less than or equal to 3 years	45	3.94	1.58 to 9.8	0.003
Multivariate analysis				
High grade tumour	73	4.83	2.43 to 9.62	<0.001
Age less than or equal to 3 years	45	3.46	1.32 to 9.09	0.012

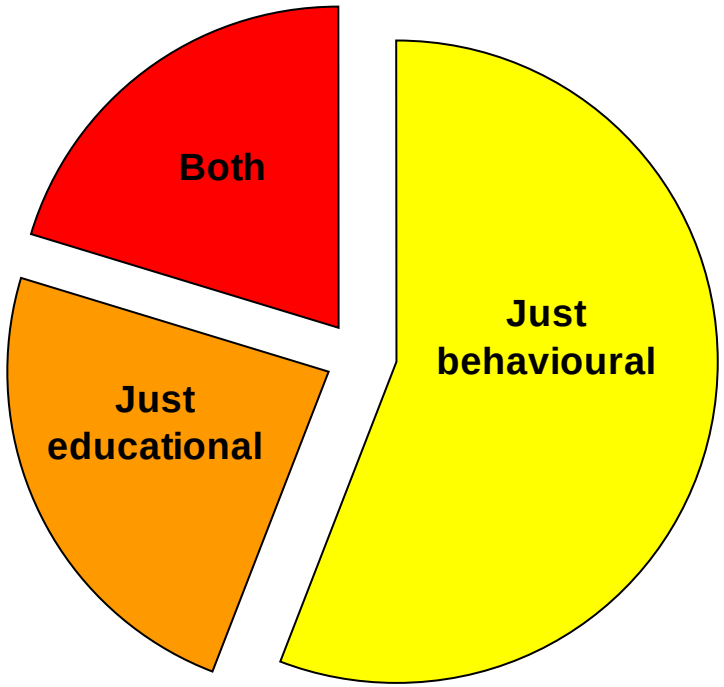
Diurnal pattern of headache
(n = 70 recorded)



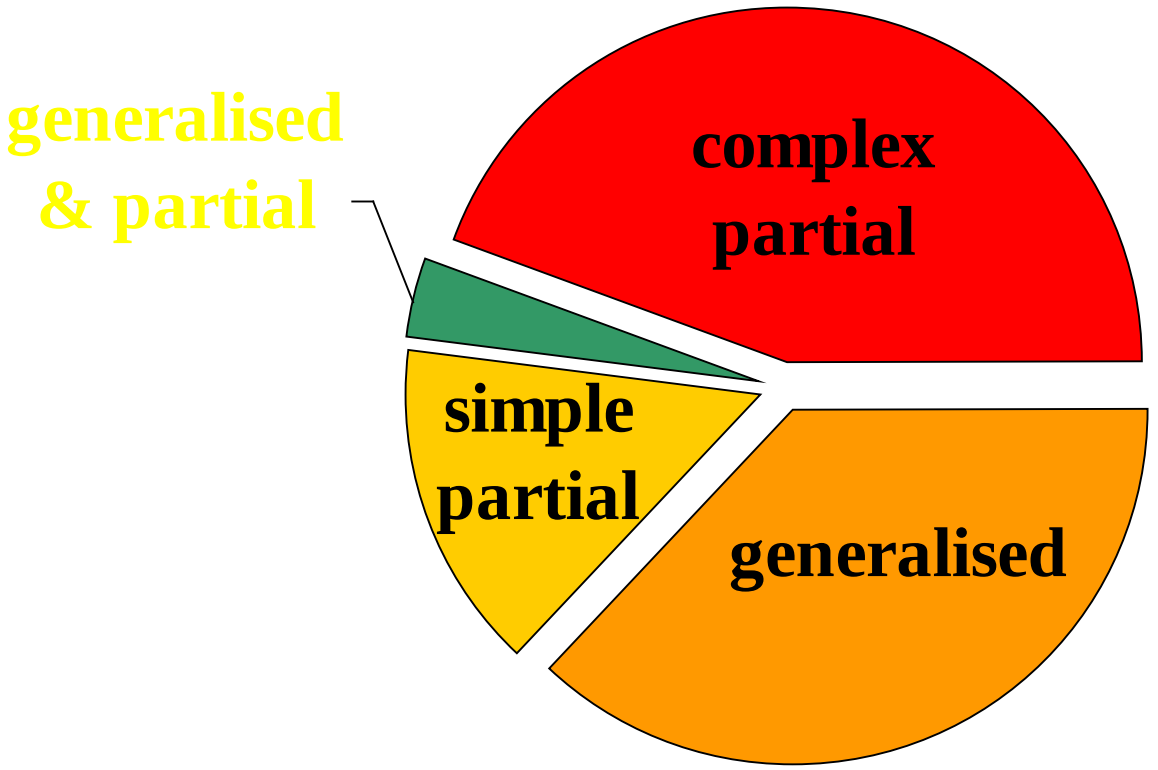
Visual disturbance (n = 69 / 76 recorded)



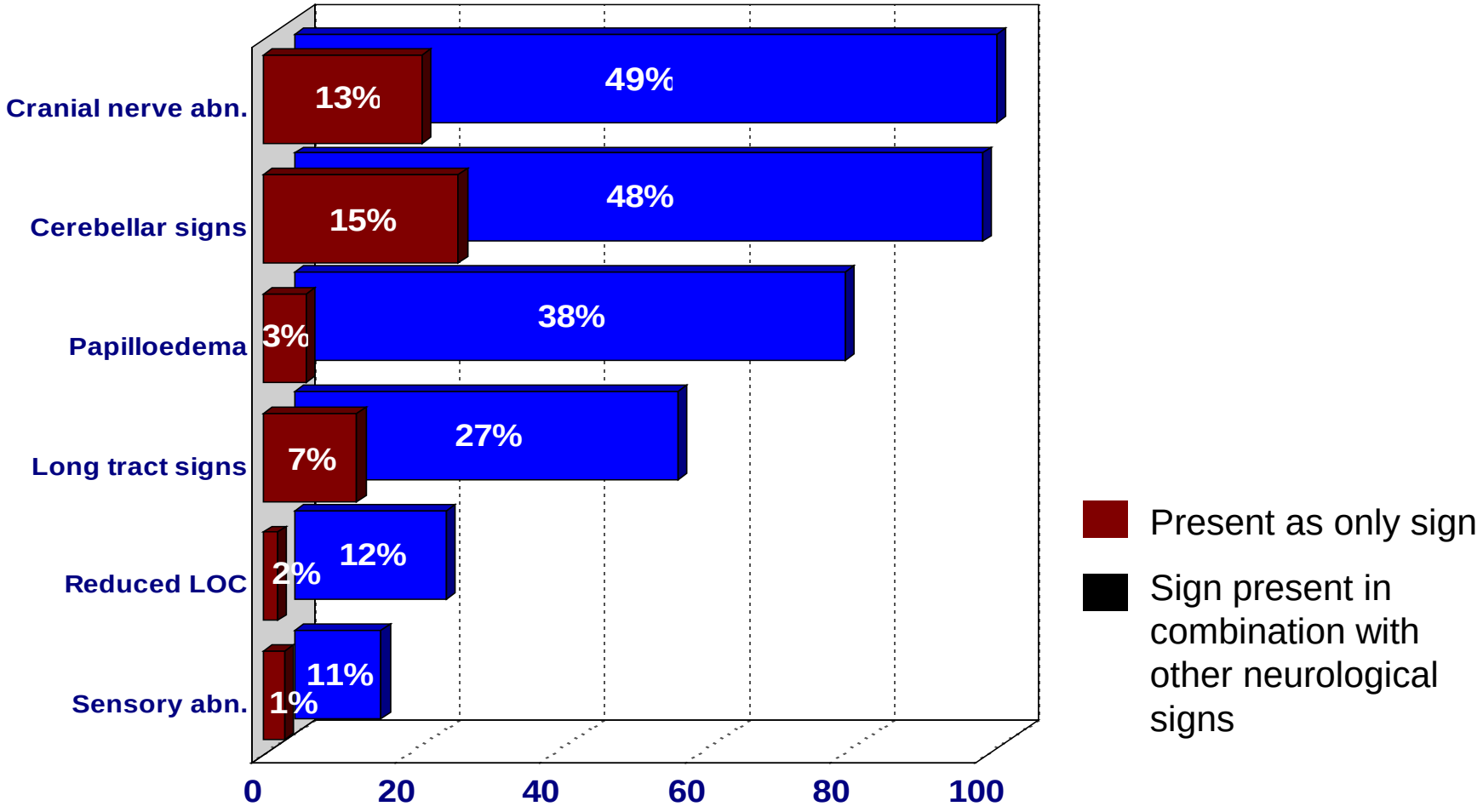
Behavioural / Educational Problems
(n = 79 recorded)



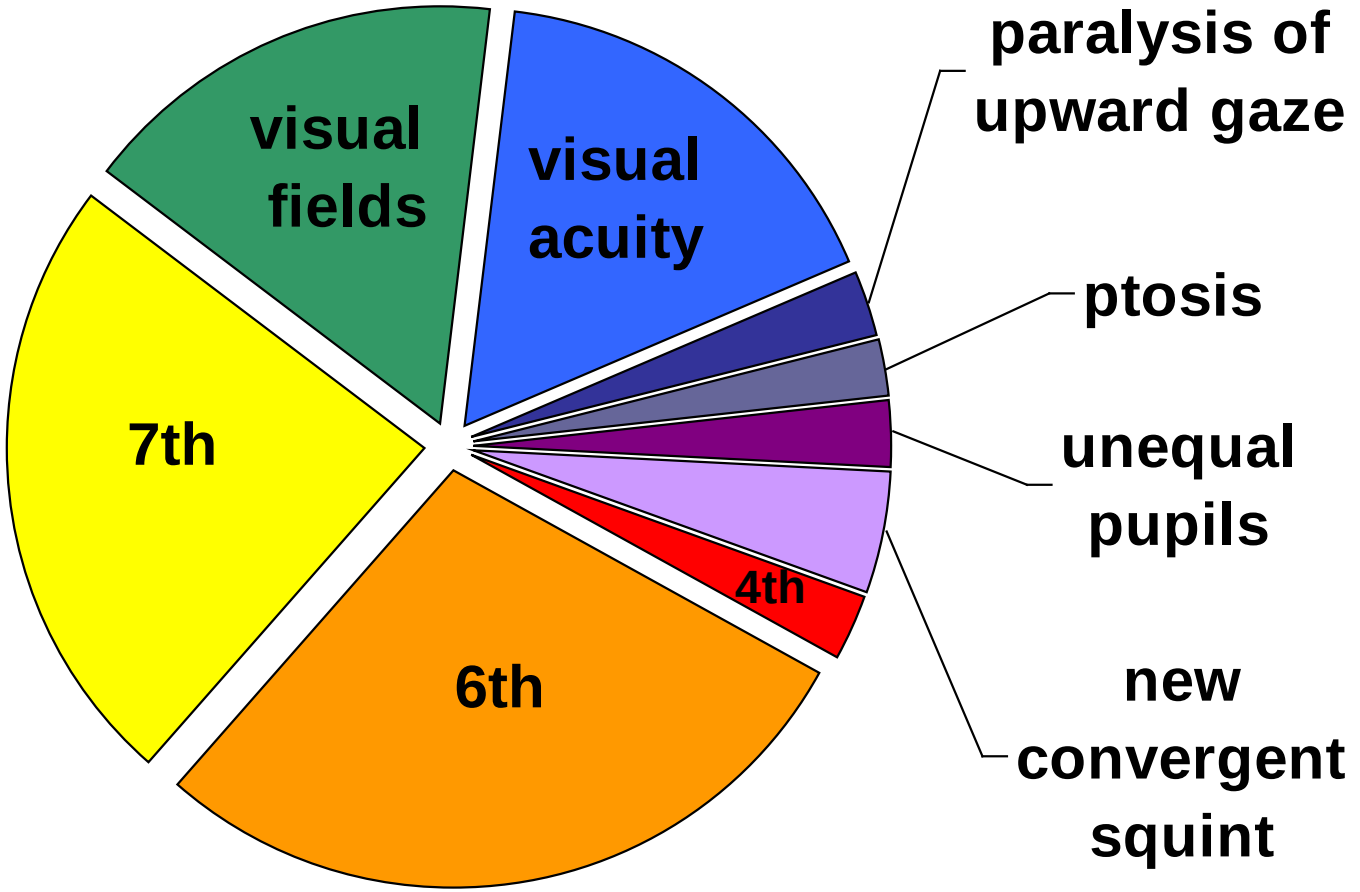
Seizures
(n = 27 recorded)



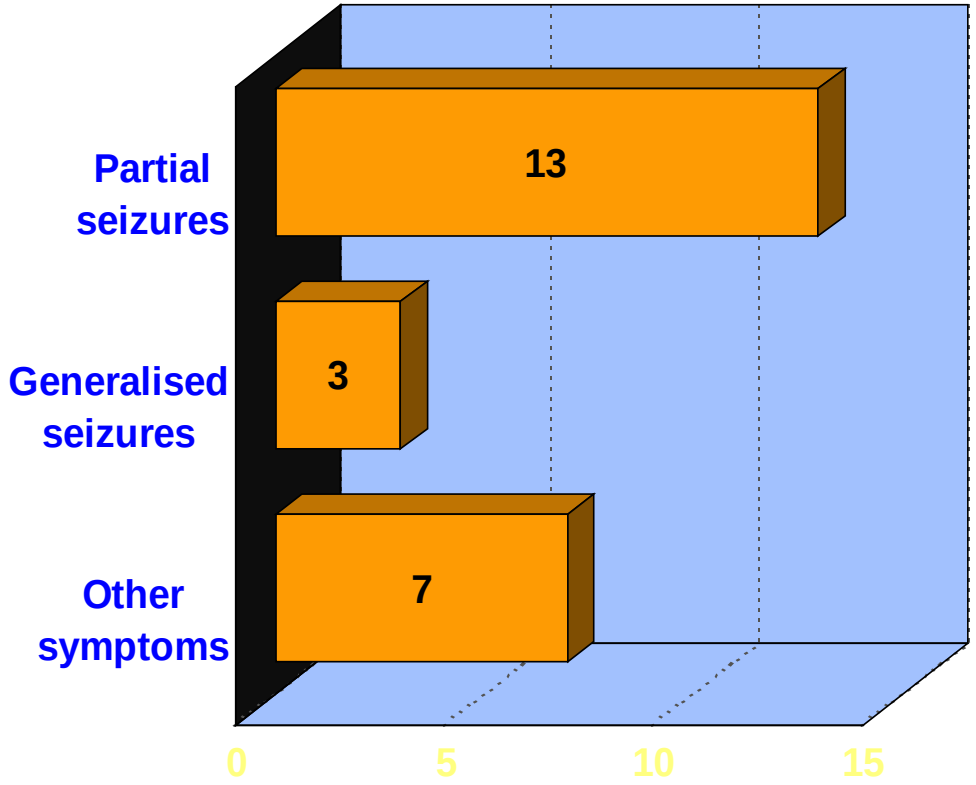
Abnormal neurological signs
n = 175 (88%)



Cranial nerve involvement (n = 31/97 recorded) - Piechart



23 children (12%) with no abnormal neurological signs



‘MRI is particularly important in those who develop epilepsy before the age of two years…or who have any suggestion of a focal onset on history, examination or EEG (unless clear evidence of benign focal epilepsy).’ NICE guidelines on management of epilepsy , 2nd consultation, April 2004

Conclusions

- Enquire about not only vomiting and unsteadiness but also visual, educ/behav, endocrine problems
- Examine not only motor system but also cranial nerves (esp fundi, visual acuity & fields, eye movements), growth and head size
- Always consider cranial imaging for partial Sz or gen Sz with either additional Sx or persistent focal EEG

Summary

- Headaches
  - affect more than half, diurnal in 2/3
  - always assoc with other symptoms esp vomiting (>75%)
- Visual, educ/behav Sx, unsteadiness each affect c. 40%
- Endocrine, educ/behav, visual Sx, H/A or Sz $\Rightarrow$ longer history
- Abnormal neurol signs present in 90%
  - including 50% with cranial nerve, 50% with crbllr signs
  - 20% had papilloedema and/or cranial nerve signs alone
- Neither abnormal neurol signs nor seizures in v few (3.5%)

Wilne SH, Ferris R, Nathwani, A, Kennedy CR.
Archives of Disease in Childhood, 2006, 91:502-06

References

- **The presenting features of brain tumours: a review of 200 cases.** Wilne SH, Ferris R, Nathwani A, Kennedy CR.

  Arch Dis Child, 2006, 91:502-06.

- **The presentation of childhood central nervous system tumours: a systematic review and meta-analysis.** Wilne S, Collier J, Kennedy C, Koller K, Grundy R, Walker D.

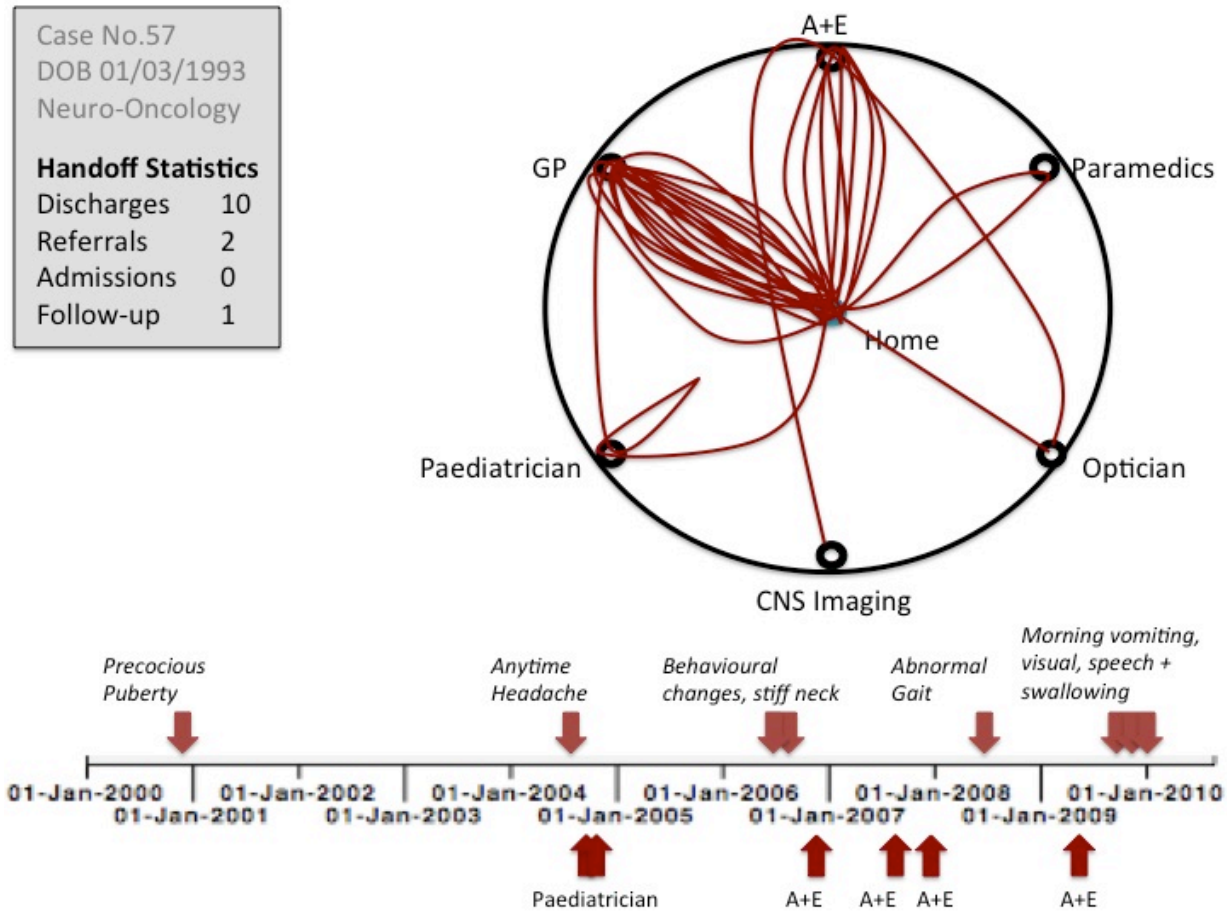
  The Lancet Oncology, 2007, 8: 685-695

HEADSMART
be brain tumour aware

Many children present with signs and symptoms associated with a brain tumour, but are not immediately diagnosed

Brain tumours mimic very common childhood illnesses, complicating diagnosis

Consequently children often have multiple contacts with health professionals before diagnosis



Headsmart Project

- Research project (2002 onwards)
  - pathways and time taken to diagnosis for children and young adults with a brain tumour

- Led by Professor David Walker
  - Professor of Paediatric Oncology, Brain Tumour Research Centre, Nottingham (CBTRC)
  - acts as Clinical Lead on HeadSmart
- Findings published in *Lancet Oncology*
  - a systematic review and meta-analysis of the literature on childhood brain tumour presentation – 2007

HeadSmart Partnership & Campaign Created

HEADSMART
be brain tumour aware

- Four organisations unite to undertake HeadSmart campaign - 2008

SAMANTHA DICKSON BRAIN TUMOUR TRUST
Head to head with brain tumours

Children's Brain Tumour Research Centre

The Health Foundation
Inspiring Improvement

RCPCH
Royal College of Paediatrics and Child Health
Leading the way in Children's Health

- Campaign launched - June 2011
- Working throughout with others

NHS

RCGP Royal College of General Practitioners

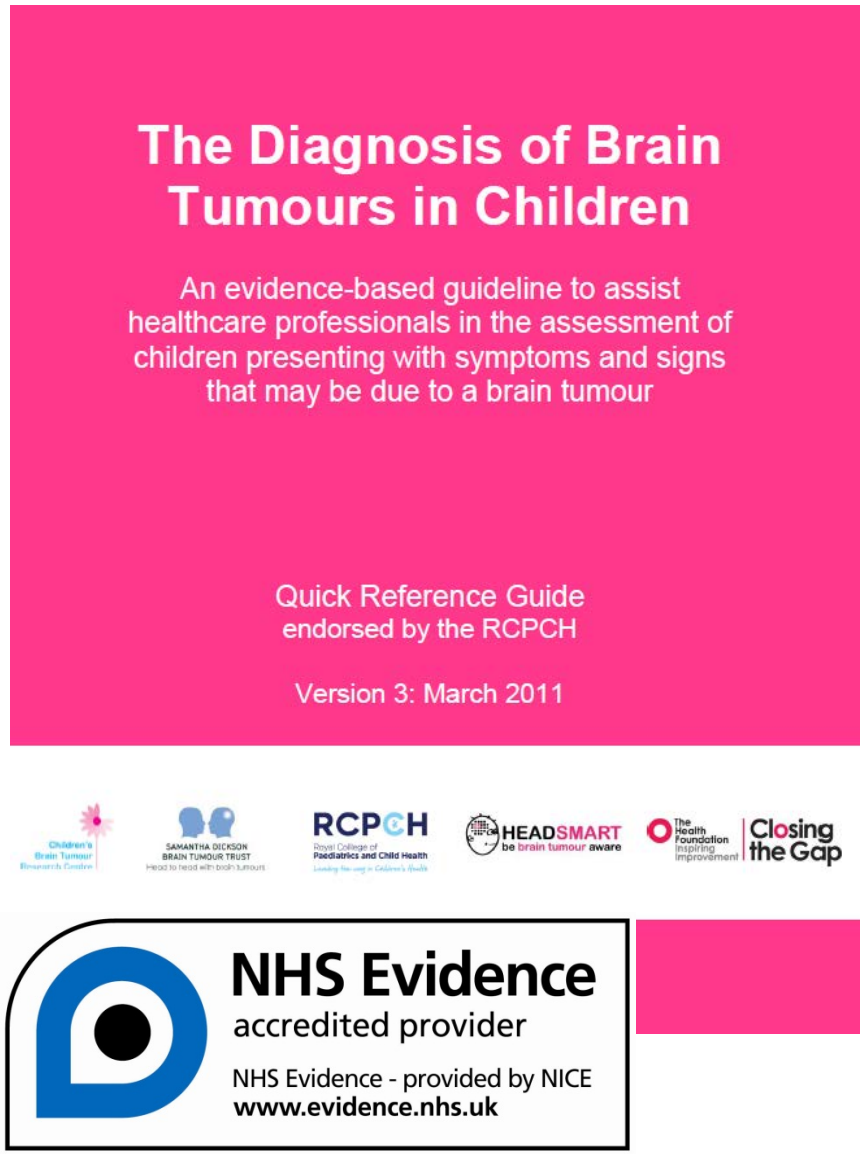
RCR The Royal College of Radiologists

The College of Emergency Medicine

CANCER RESEARCH UK
DH Department of Health
NHS

CCLG
Children's Cancer and Leukaemia Group
caring for children - curing their cancer

Guideline Development



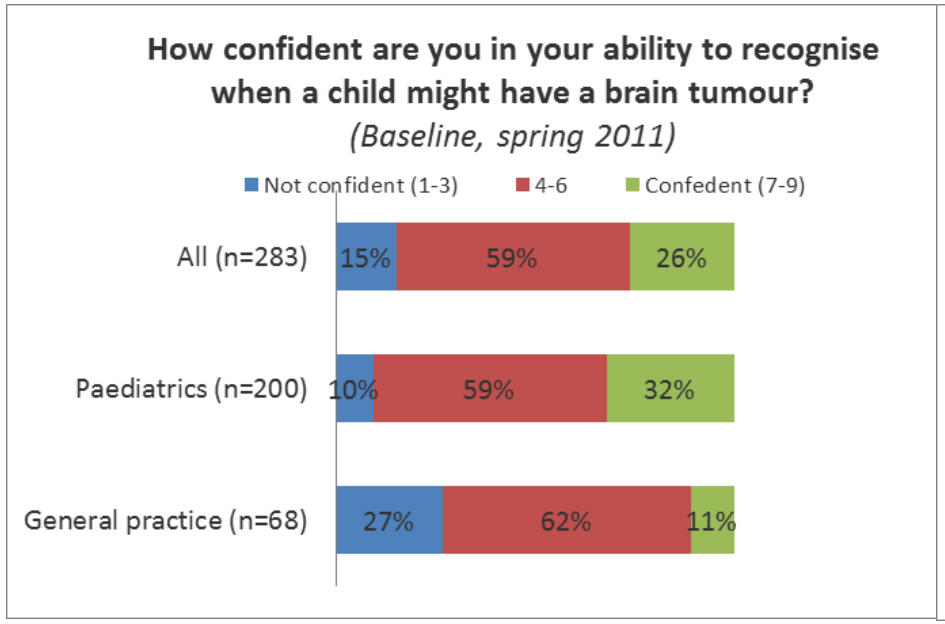
- CBTRC literature review results used in development of **Diagnosis of Brain Tumours in Children guideline** – 2007
- Supports health professionals
- Identification of symptoms/ signs of brain tumours
- Indications for imaging
- Referral times for imaging
- Endorsed by RCPCH in 2008
- Published in ADC in 2010
- NHS Evidence Accreditation received in 2011
- Used as basis for development of HeadSmart materials

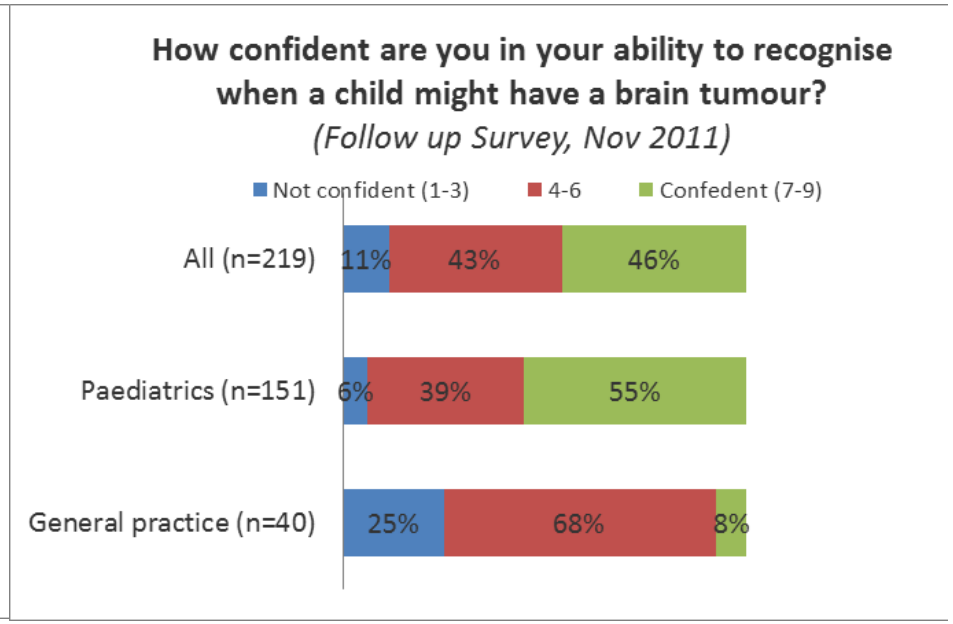
Initial Dissemination - **HeadSmart** Launch

- Information pack sent to:-
  - Every GP surgery in East Midlands
  - Clinical champions
  - Campaign supporters (through SDBTT)
- Information pack included:-
  - Explanation of HeadSmart (leaflet)
  - Posters
  - Symptom cards
- Media campaign (national and regional)

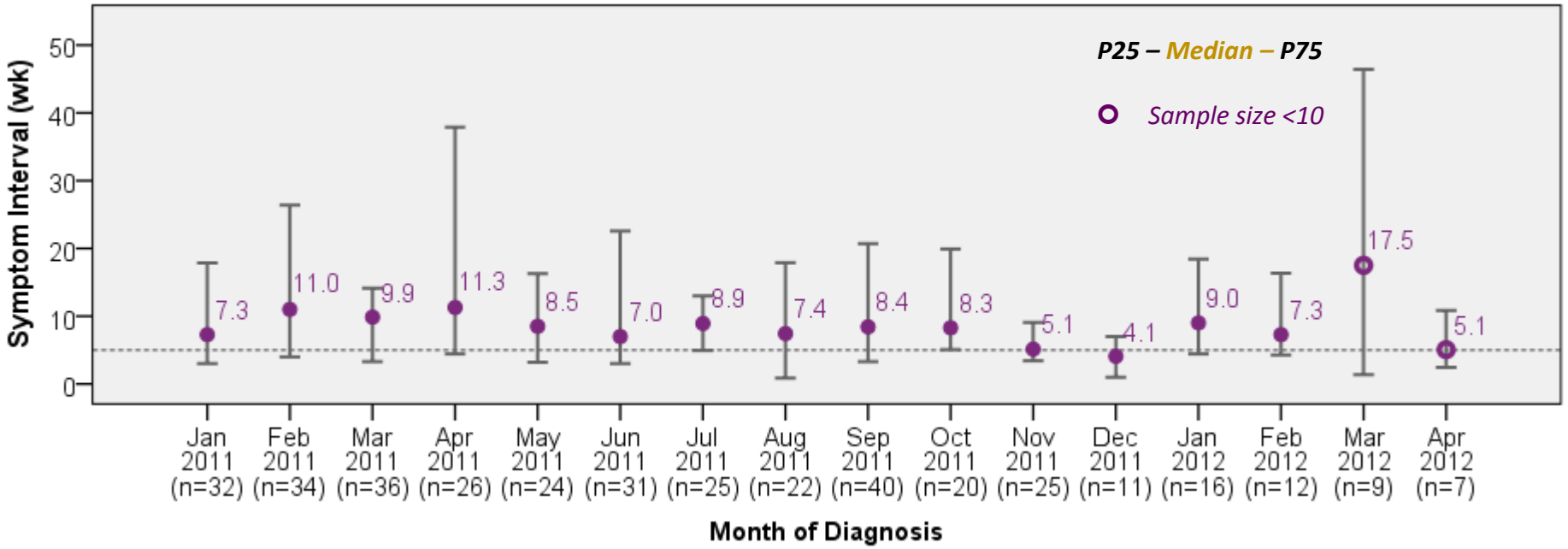
Evaluating HeadSmart

- Professional and public awareness surveys
  - 11% of the public aware of HeadSmart
  - Health professionals more confident





Symptom Interval by Month of Diagnosis (weeks)

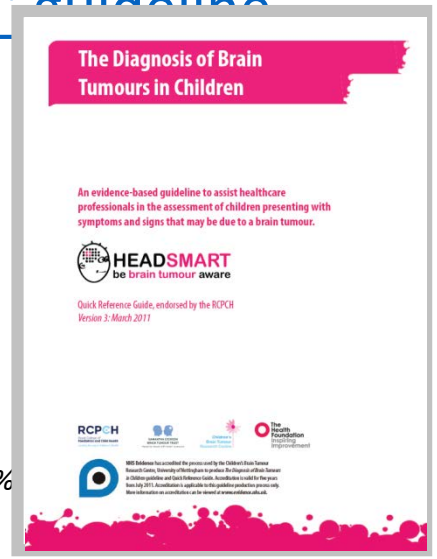


Median Symptom Interval		
All patients (n=376)*	**8.1 weeks (min 0, MAX 398.1)**	**1.9 months (min 0, MAX 91.6)**
Pre-launch (n=155)	9.3 weeks (min 0, MAX 398.1)	2.1 months (min 0, MAX 91.6)
Post-launch (n=219)	7.5 weeks (min 0, MAX 363.6)	1.7 months (min 0, MAX 83.6)

** Two patients with date of diagnosis missing, therefore numbers don't add up.*

Resources specifically for health professionals

- 'Diagnosis of Brain Tumours in Children' guideline
  - NHS Evidence Accredited, RCPCH endorsed, best practice guideline



http://www.rcpch.ac.u ldren%20Guideline

NHS Evidence accredited provider
NHS Evidence - provided by NICE
www.evidence.nhs.uk

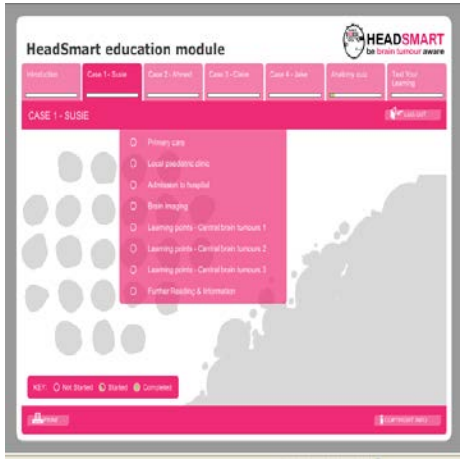
)Brain%

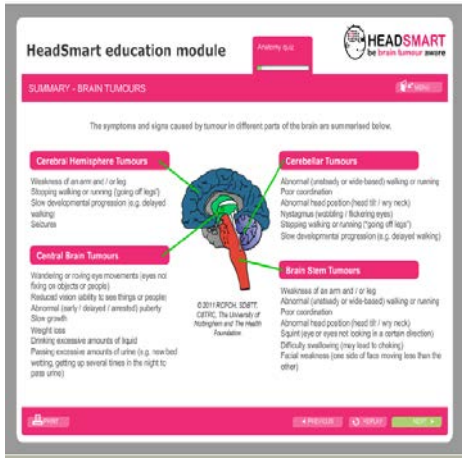
- Detailed symptoms leaflet

Resources specifically for health professionals

- Online interactive Education Module

  www.headsmart.org.uk/edu/launch.html





"Interesting, informative and definitely needed. I would like to forward this to all the paediatricians and GPs I know"

(Consultant Paediatrician specialising in Paediatric Oncology)