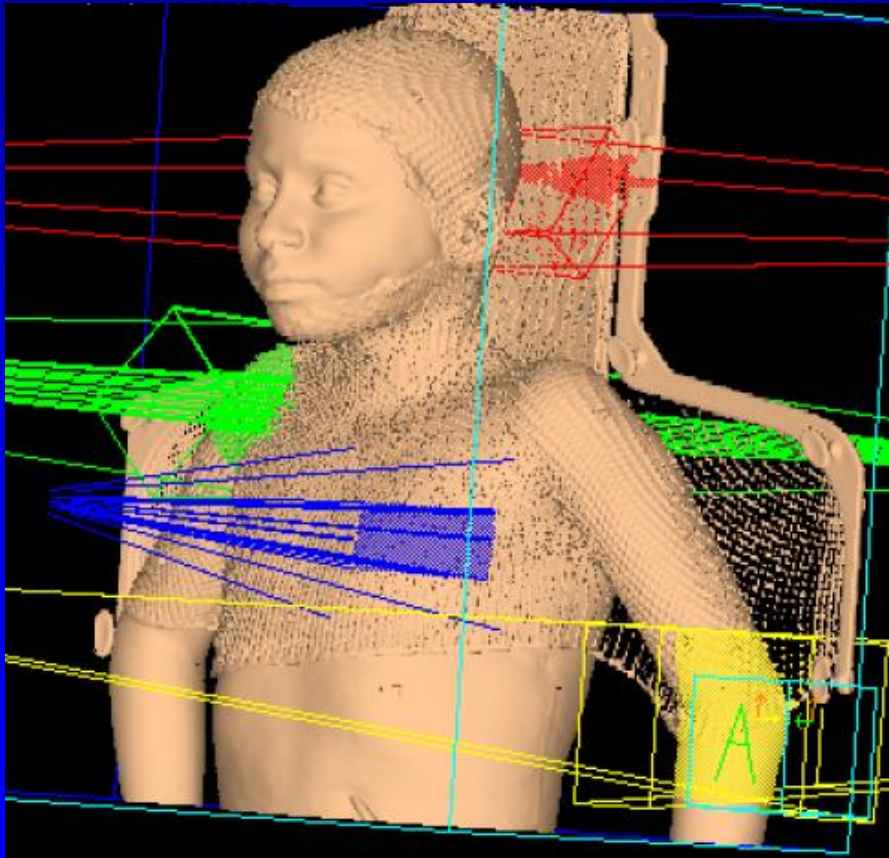


# Radiation, Palliation, Communication

## Recurrent Malignancies and Role of Radiotherapy



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# Recurrent Malignancies and Role of Radiotherapy

## General Principles

- Pain is the number 1 reason
- See the child/family ASAP (often same day, or next day)
- Main Message: we are always available on short notice to deal with pain, and RT is very effective in most cases
- Provide RT ASAP (often same day, or next day, treat on weekends)
- Minimize the fraction numbers to minimize disruption to child's ongoing care and minimize trips to hospital in a setting of a limited amount of time to live
- The larger the volume or the proximity of radiation sensitive organs, then the more likely to deliver 5-10 fractions rather than a single fraction

# Role of RT in Recurrent Pediatric Malignancies

- Recurrent brain tumours
  - Curative intent (ependymomas)
  - Palliative intent (malignant gliomas)
- Bone metastases
- Soft tissue recurrence/metastases
- Neurologic metastases
  - brain metastases, cord compression, leptomeningeal

# Role of RT in Recurrent Pediatric Malignancies

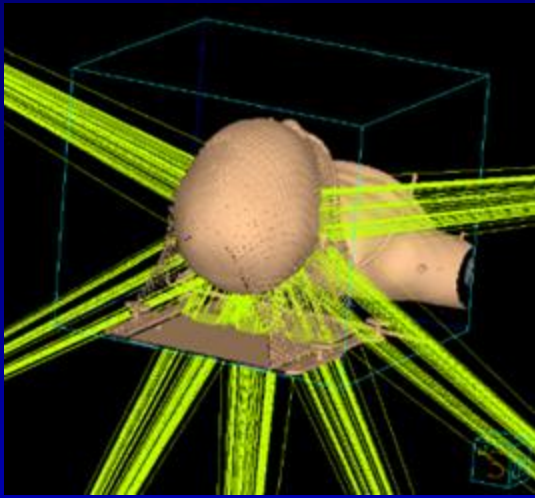
- Recurrent brain tumours
  - few effective systemic therapies at recurrence
  - significant improvements in our ability to focus RT dose in the brain with better sparing of uninvolved brain in last 10-15 yrs
  - recently learned of the ability of the brain to recover after prior courses of high dose RT
  - has led to use of Re-RT in many recurrent brain tumours

# Role of RT in Recurrent Pediatric Malignancies

- Bone metastases
- Soft tissue recurrence/metastases
  - usually given in addition to ongoing systemic therapies at recurrence in most cases

# Role of RT in Recurrent Pediatric Malignancies

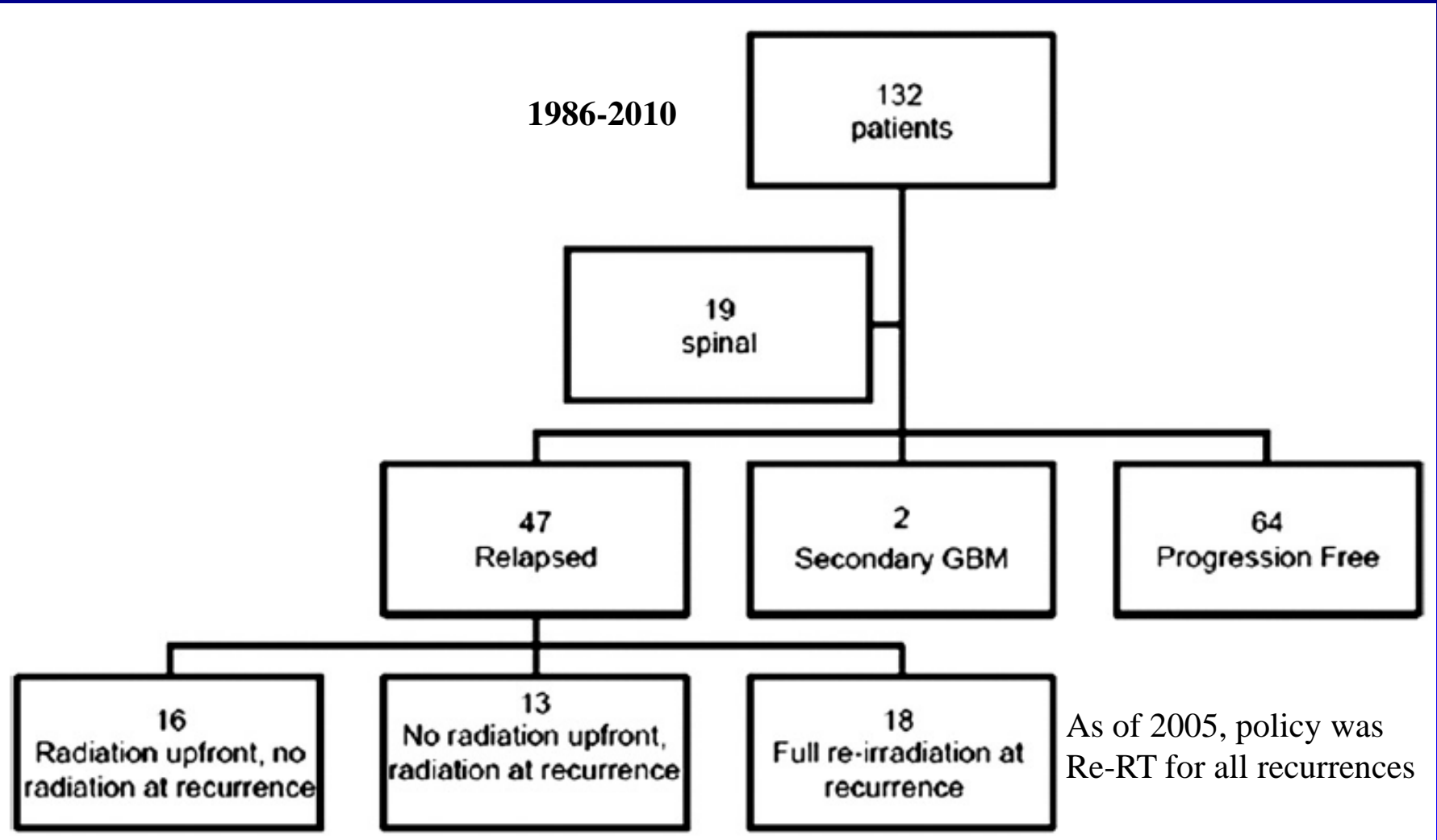
- Neurologic metastases
  - brain metastases, cord compression, leptomeningeal
  - most often seen later in evolution of metastatic disease with short survivals following development of these metastases



# Re-RT: Ependymomas

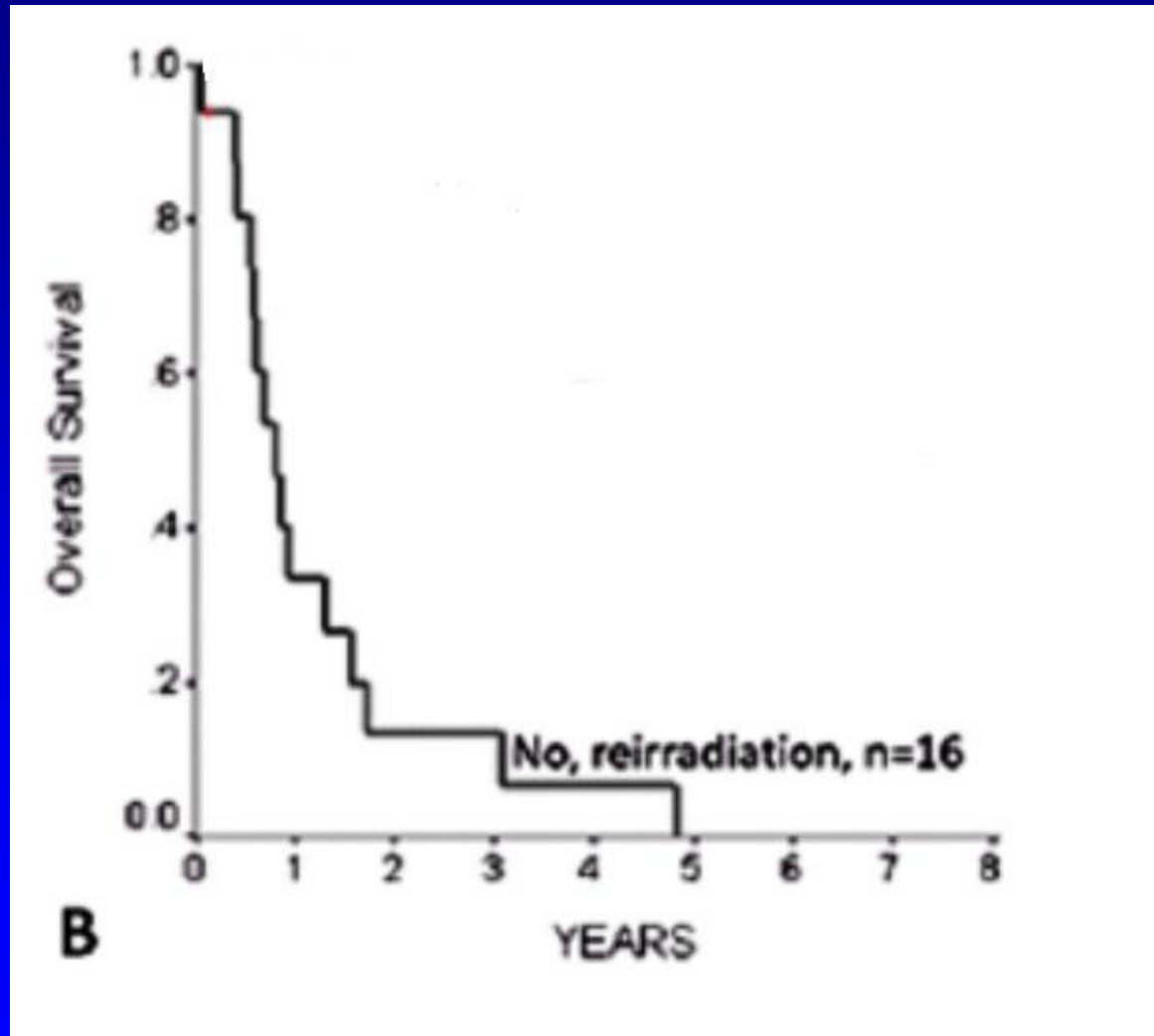
- several small series with SRS at recurrence
- poor outcomes with radiation necrosis, CSF dissemination
- St Jude's series with fractionated RT demonstrated safety and efficacy, but an uncontrolled selected series
- led us in Toronto to offer repeat surgery and fractionated Re-RT to every child children with recurrent ependymoma who had previously received RT at initial presentation beginning in 2005

# Toronto Experience Re-RT Ependymoma

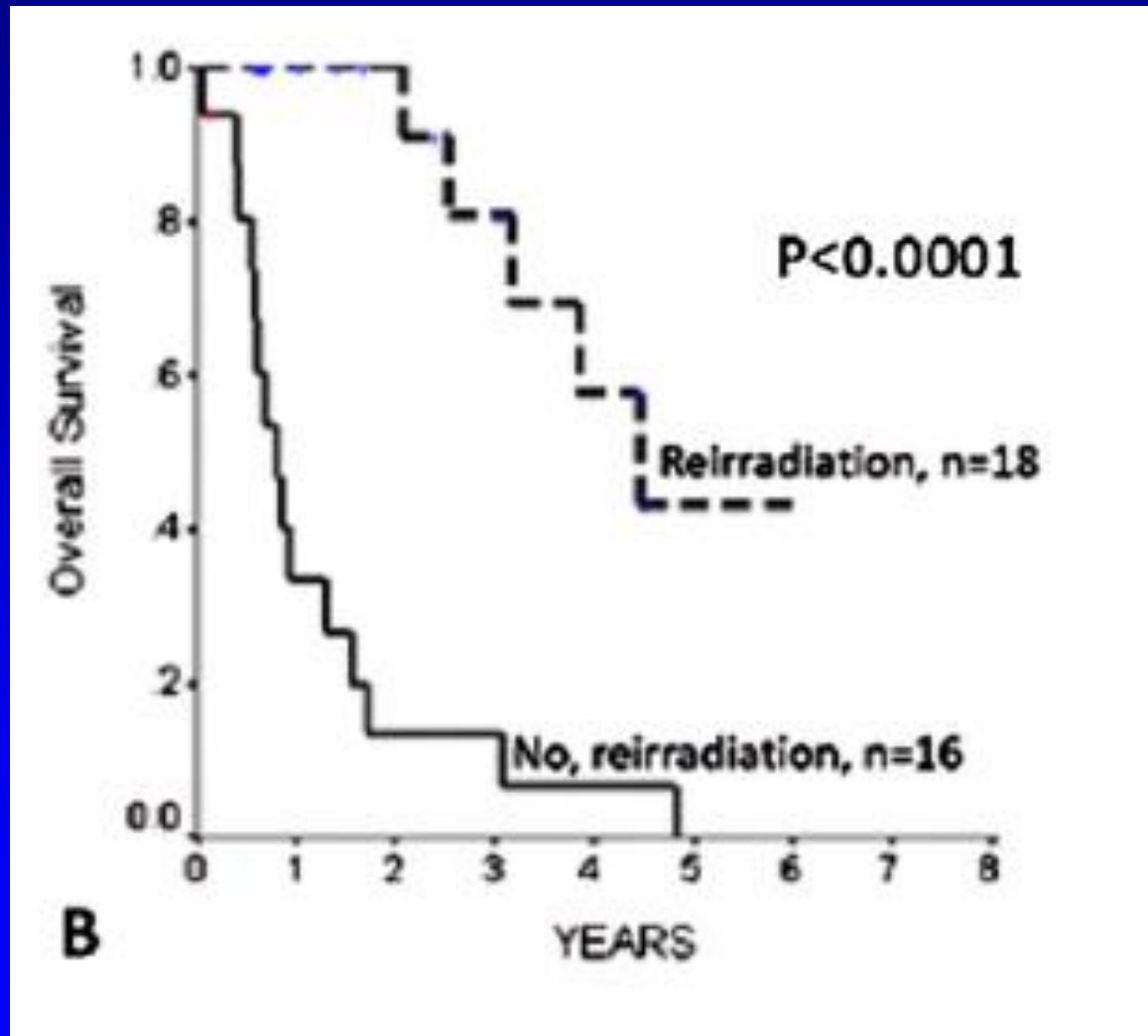




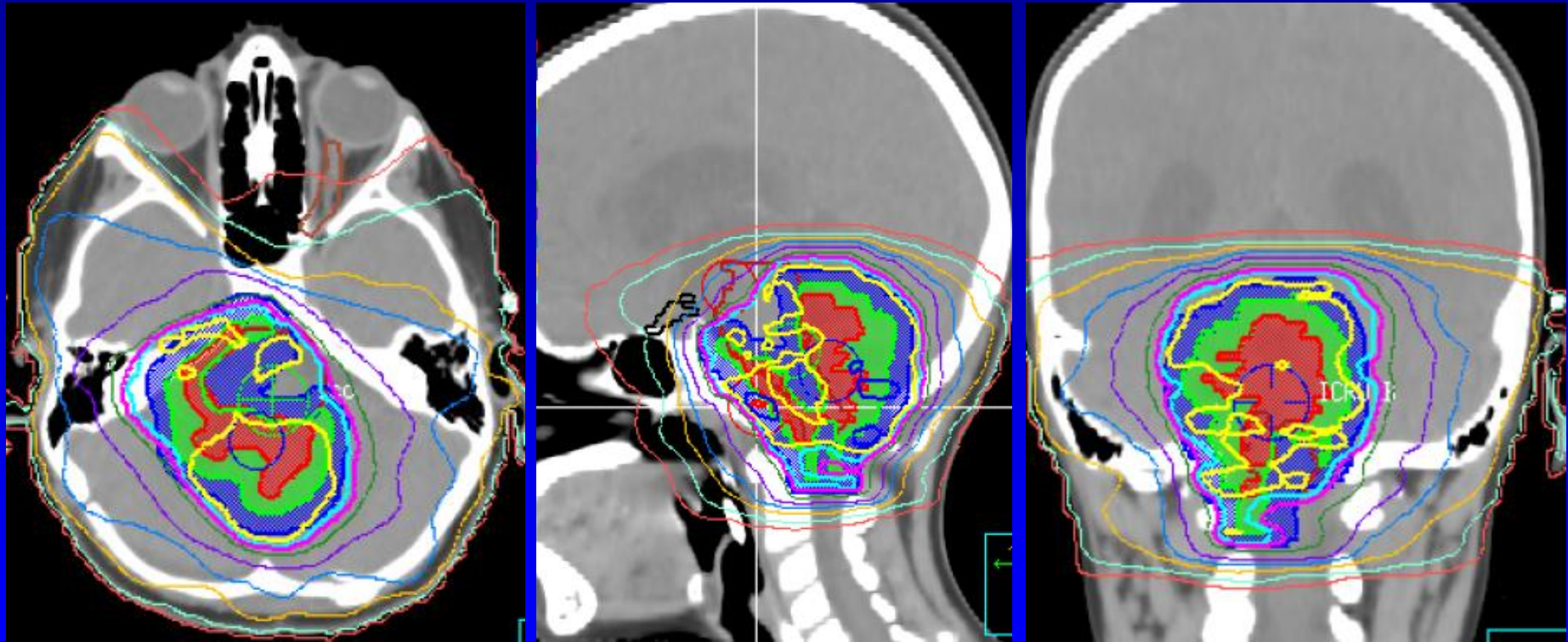
# Toronto: Ependymoma No Re-RT at Recurrence



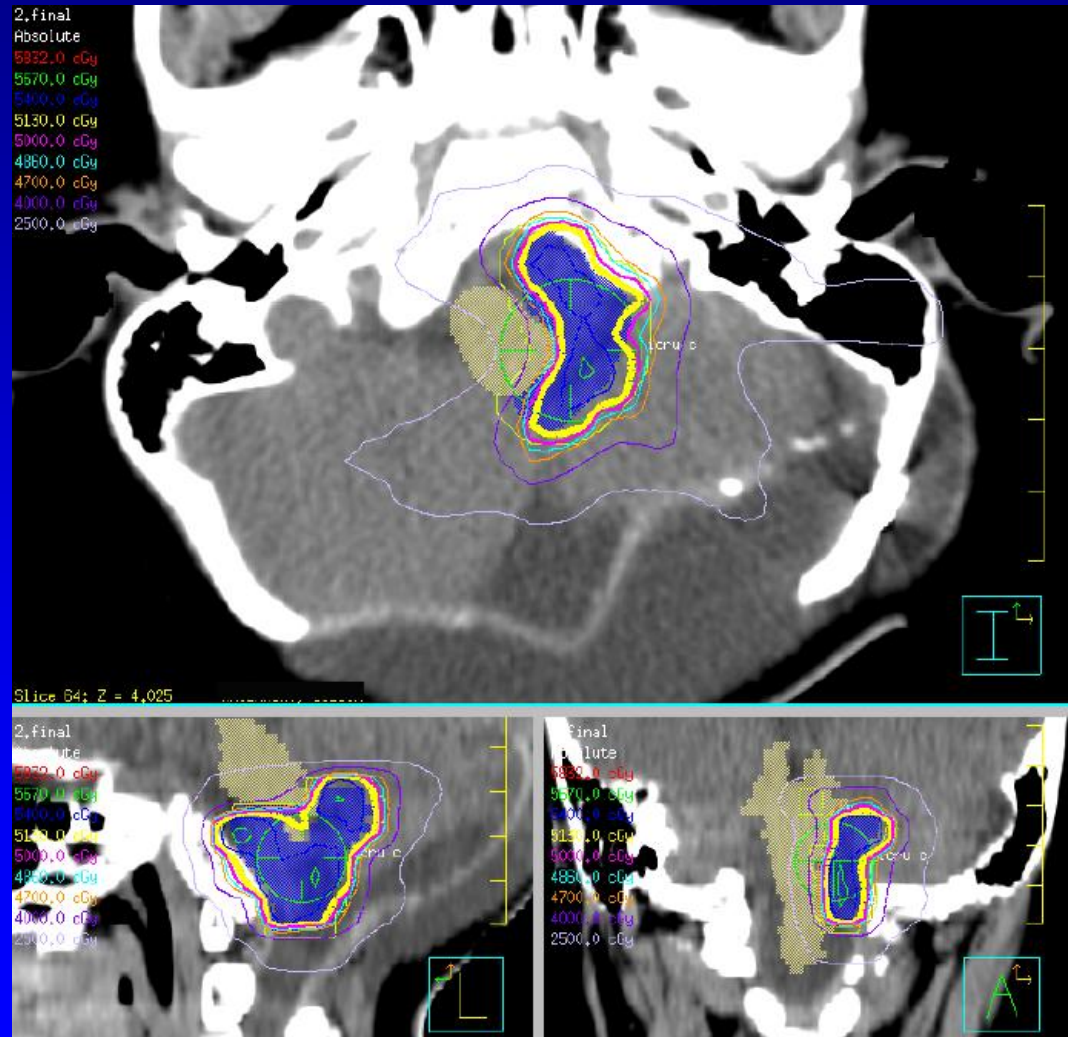
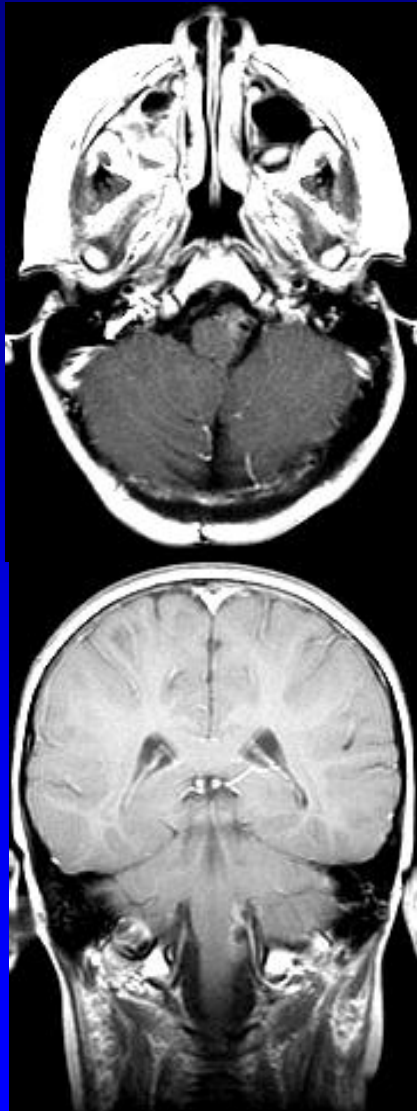
# Toronto: Ependymoma Re-RT at Recurrence



# Example of Initial Post Surgical RT Plan 59.4 Gy/33



# Example of Second Focal Re-RT Plan 54 Gy/30



# Re-RT: Ependymoma

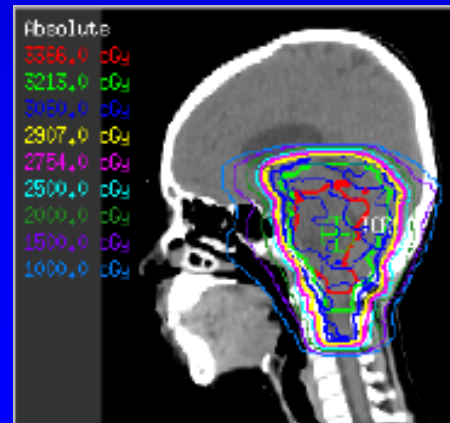
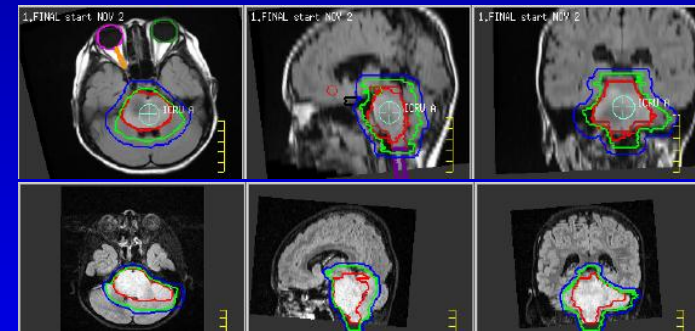
## Curative in 1/3 of Patients

- after local only RT, 1/3 of patients are long term survivors, 2/3 failing with CSF dissemination
- now routinely give CSI 36 Gy/20 followed by boost to total 54 Gy/30 to local area of recurrence in children
- have now retreated 40 children, will soon reassess results with routine CSI included at recurrence



# Re-RT: DIPG & Malignant Gliomas in Children: Palliative

- Poor survival, no useful therapy at recurrence
- Now offer Re-RT to all children with recurrence at Sick Kids
- Initially 54 Gy/30, give 30.6 Gy/17 at recurrence

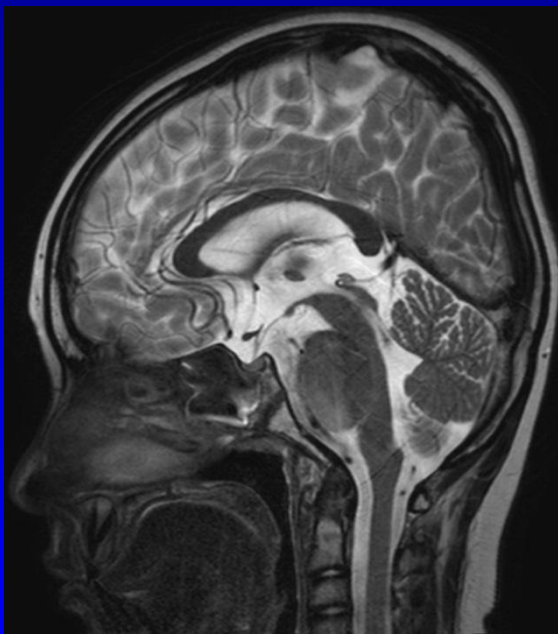


October 2013

December 2013

8 yo girl with recurrent DIPG after prior 54 Gy/30  
in August 2012

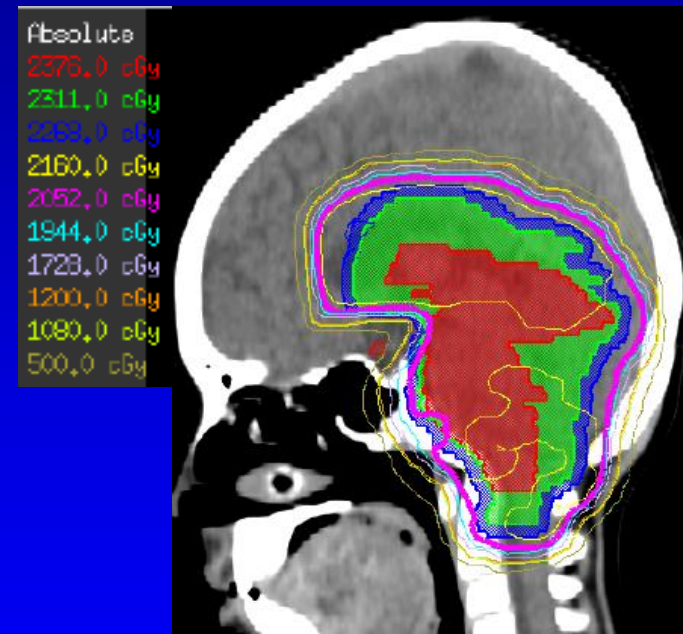
# Re-RT: DIPG & Malignant Gliomas in Children



December 2013



March 2014



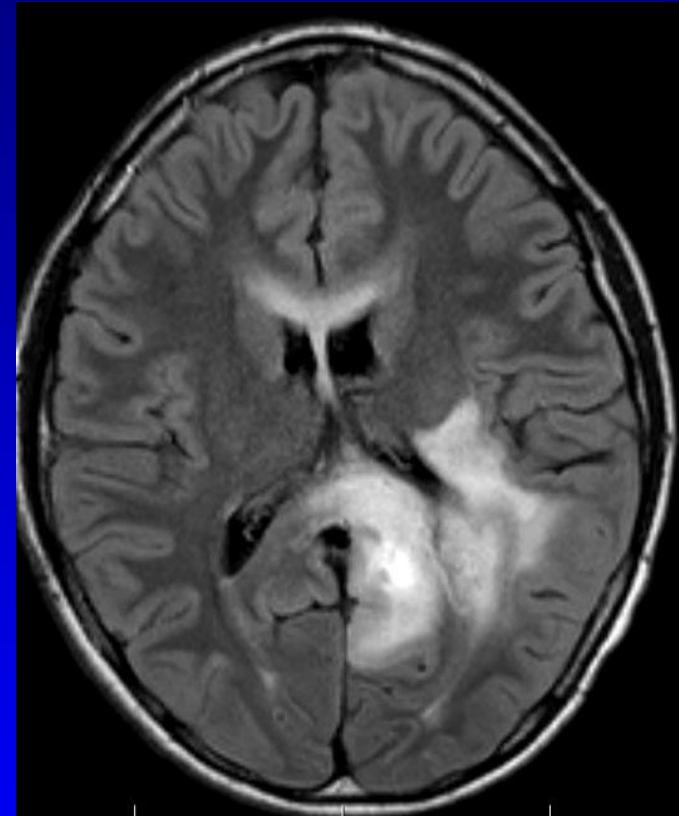
Re-RT 54 Gy/30 Aug/2012  
30.6 Gy/17 Oct/2013  
21.6 Gy/12 Apr/2014

# Re-RT-DIPG-SIOP 2015 Canadian Experience

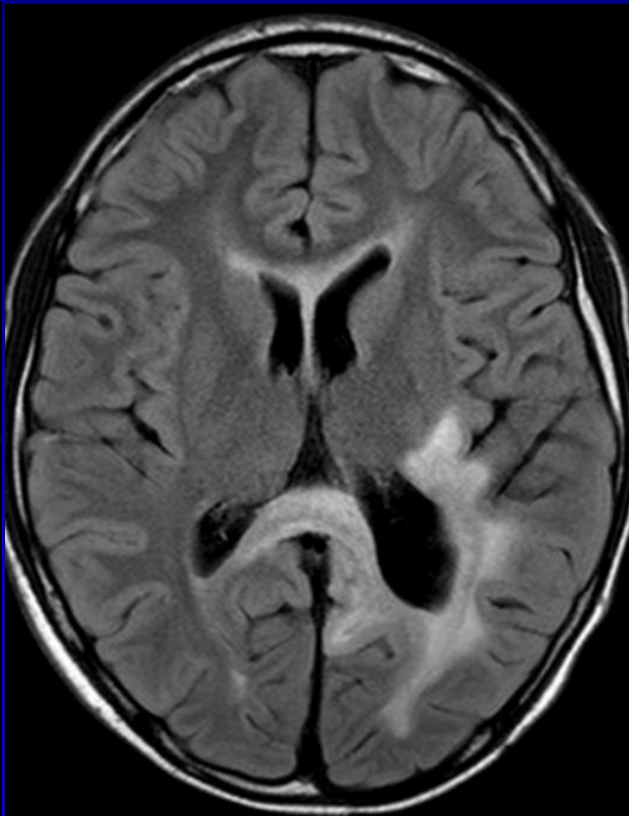
- 10 cases treated since Sept 2013
- Median time from diagnosis to progression was 12 months (range, 4-37m)
- 9 of 10 patients has significant recovery,  
4 patients full recovery
- median time from re-irradiation to death of 9 months (range, 5-13m)
- historic cohort of 46 patients no Re-RT  
median time from progression to death was 91.5 days
- current cohort of 10 patients with Re-RT
- median time from progression to death was 171 days



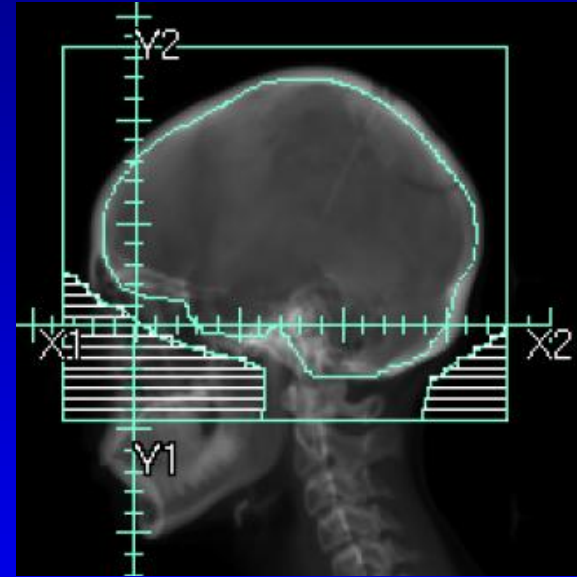
# Glioblastoma Re-RT



January 2014



March 2014



April 2013      15 yo male 54 Gy/30/temozolomide/avastin  
January 2014    Progressing on systemic therapy  
Re-RT 30.6 Gy/17 to whole brain opposed laterals

# Role of RT in Bone Metastases

- most often seen in neuroblastoma and Ewing's sarcoma
- pain is the main symptom
- RT is typically either 8-10 Gy/1 or 20 Gy/5 fractions depending on patient's overall situation
- few reports in the literature, but relief of pain achieved in 65-80% of cases
- notable exception are bone metastases from osteogenic sarcoma, typically give 25 Gy/5 fractions with variable response

# Role of RT in Soft Tissue Metastases

- pain is the main symptom, swelling & bleeding
- RT more typically given as 20-30 Gy/5-10 fractions
- related to large volumes, RT sensitive organs (bowel, lung)
- pain response rates in 65-80% range

# Role of RT in Neurologic Metastases

brain metastases, cord compression, leptomeningeal

- loss of neurologic function is the main symptom, pain with cord compression
- RT usually given as 20Gy/5 fractions
- volumes are usually whole brain, partial spine, rarely craniospinal for leptomeningeal disease (usually 30 Gy/10)
- radiosensitive tumours (neuroblastoma, rhabdomyosarcoma, Ewing's sarcoma, retinoblastoma) usually responsive
- most often seen later in evolution of metastatic disease with short survivals following development of these metastases

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