Clinical Plan evaluation

• Essentially the same process for both 3DCRT and IMRT – just need a routine so as less likely to miss things
• I start with the DVH statistics and DVH graph
• GTV and PTV70,63,56 dosimetry – maximum and minimum doses
• Minimum dose has to be related to the volume – minimum dose to 95% volume should be \( \geq 95\% \) of prescribed dose.
• Maximum dose – significant volume - \( \leq +10\% \) but that is 77Gy, so usually less than that (eg 5\%, 73.5Gy) - and depends what tissue is involved with that maximum dose, eg larynx cartilage or mandibular bone – accept even less.
DVH statistics

• Have your list of tolerance doses for OAR
• Maximum point doses for critical organs – spinal cord, brainstem, optic nerves/chiasm, brachial plexus
• D1% can be helpful adjunct to maximum point dose, but usually then looking at a higher dose.
• Often need to alter maximum accepted dose depending on GTV proximity to critical structures (as well as reducing the GTV-PTV margin)
• Critical OAR+1mm is more clinically useful than +3mm as we know we can deliver within 1mm
DVH statistics 2

- Regarding non critical OAR – parotid glands – often difficult to spare to < mean 26Gy if involved nodes are close.
- We keep the tolerance dose (maximum point dose) to brachial plexus dose to \( \leq 66\text{Gy} \), remembering that surgical resection of nodes is another (better) option if non CR post treatment (20% risk for N2, 40% risk for N3 in the pre HPV data era; now probably more like 10% N2 and 20% N3.)
- If nodal disease inoperable, then accept 70Gy on brachial plexus as no other options if no CR to chemoRT.
Axial, coronal and sagittal dosimetry review

- After DVH statistics then need to look at every slice on the axial CT planning images for dosimetry.
- Dose cloud is a useful tool to see the different areas of 70Gy, 66.5Gy, etc.
- Main difference with IMRT is the rapid dose fall off – this can be beneficial, eg GTV near optic nerve/chiasm/brainstem, but can be less than you want so need to watch that and/or give another PTV of “minimum dose” to get the margin you want.
- Need to give the planners a decision regarding the clinical choice that needs to be made in areas of “trade-off” – eg
  - not sparing the parotids at the expense of adequate dose to the involved nodes
  - tightening the “spray” of dose across the oral cavity or pharyngeal constrictor muscles, or the oral cavity
  - the clinically appropriate dose to the optic nerve/brainstem/spinal cord if the GTV volume is in close proximity.
Plan evaluation for 3-D CRT and IMRT
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Check: that 95% of the GTV and PTV gets at least 95% of the PD
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95% 70Gy is 66.5Gy

BS 54Gy in 2Gy fractions
BED (a:b 2) 56Gy/35 (1.7Gy/F)
given proximity GTV to BS
increased limit to 58Gy.
RTOG limits to 60Gy
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<td>Maximum dose to 0.03 cc of Spinal Cord</td>
<td>&lt; 45 Gy</td>
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<tr>
<td>Maximum dose to 0.03 cc Optic Nerves, Chiasm</td>
<td>&lt; 54 Gy</td>
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<td>Maximum dose to 0.03 cc Mandible, TM joint</td>
<td>&lt; 70 Gy</td>
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<td>Maximum dose to 0.03 cc Brachial Plexus</td>
<td>&lt; 66 Gy</td>
<td>≤ 70 Gy</td>
<td>&gt; 70 Gy</td>
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<td>Maximum dose to 0.03 cc Temporal Lobe</td>
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<td>≤ 72 Gy</td>
<td>&gt; 72 Gy</td>
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<tr>
<td>Mean dose* to one of Parotid glands</td>
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<td>26 - 33 Gy</td>
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