

# Contrast Crisis 2022

From CT Wiki

## Current IV contrast status: IV Contrast Inventory is insufficient to continue with routine practice

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## General information for all protocols

1. Minimize repeat boluses (e.g. as with PE studies). Check with radiologist for approval prior to repeat bolus.
2. Use alternative contrast for non-IV administration (oral, rectal and GU/bladder administration).
  1. Substitute oral Barium agent for oral Omni for almost all abdominal CT exams where appropriate. Use caution with oral barium in cases where there is concern or possibility of bowel leak/perforation. For pts who still need Omni, could reduce total volume administered. Could also consider Breeza administration in some cases.
  2. Use Cystoconray for CT cystograms as would be done in GI.
3. "Routine exams" that use weight-based dosing on Medrad P3T or the printed contrast tables we use for the Ulrich injectors will now use the tables below for chest and abdomen sections.
4. **Do not adjust flow rates.** We use bolus tracking which will account for the smaller volume of contrast already.
  1. With the exception of when you may need to substitute a lower strength contrast agent for a higher one for a CTA.
    1. For example, if you must use 300 mgI/ml in place of 370 mgI/ml, consider increasing the flow rate to the maximum the IV and patient can handle. you do not need to make this flow rate adjustment for switching between 350 and 370 mgI/ml concentrations.

Need help converting from one contrast strength to another? Use this tool [Click here and use the section named "simple conversion calculations" (<https://uwgect.wiscweb.wisc.edu/general-resources/ct-contrast-volume-and-flow-rate-calculator/>)]

## Patient FAQ

Verbiage for interacting with patients.

We are currently experiencing a national shortage of iodinated contrast. This is due to manufacturing issues, and we are not expecting more IV contrast to be delivered for months. After careful planning and triaging, we have enacted a contrast conservation strategy. Physicians have consulted to determine which scans must be performed with IV contrast, which can be performed without contrast, and which should be moved to alternative modalities (MRI/ Ultrasound). It has been determined that for your specific clinical case, the radiologists are able to see what they need without the use of IV contrast.

1. Why can't I get my exam as scheduled?

1. Our radiologists use contrast dye to help us better see and understand the CT scan images we take of your body. The supplies of this dye have been affected by supply chain issues related to COVID-19 lockdowns in China. Right now, our supplies of this dye are low enough that we need to reserve them for patients with emergencies.

2. When did the supply chain issue start? When will the dye be back in stock?

1. Problems getting this dye started in late April 2022. Right now, we don't know when it will be back in stock. This problem could last through the summer.

3. What is iodinated contrast?

1. This is the dye we use for CT scans and other exams. It's a prescription medicine that's usually put into the body through an IV to help us check different organs for problems such as infection, inflammation, cancer, and other things. The contrast often helps us make a diagnosis during a CT exam.

4. Are you canceling my scan?

1. Depending on your situation, two things may happen. Your CT exam may be rescheduled to later this year. Or we may schedule you for a different type of exam. The provider who ordered your original exam will decide. Someone from our scheduling team will help you find a new appointment.

5. When am I going to be able to get my exam?

1. Right now, we think we'll get the contrast dye back in stock later this summer. Rescheduled appointments will begin at that time.

6. What if you don't get the dye back in stock by later this summer? Will I be rescheduled again?

1. Maybe, but that would only happen if this problem continues well into the summer.

7. I need an exam right away. Do I have any options?

1. There are other types of exams that might help us with your case. For example, your provider may have you come in for a CT scan that doesn't use contrast dye, an ultrasound, or an MRI. It will depend on your specific situation. Your provider will make the best decision for you.

8. What if I don't get my CT scan as originally scheduled? How does that affect my medical care?

1. Every person is different. Sometimes, we need imaging results to make decisions about surgery, medicines, or other treatments. A different type of exam might help us with your case. It might also be OK for you to wait until later this summer to get your CT scan. Your provider will work with you to make the best decision for you.

9. If UW doesn't have contrast dye, can I just go somewhere else for my CT?

1. Maybe – the dye shortage is happening around the world. Many other health systems and imaging centers are having the same problem. There may be some places that are still offering CT scans with

## Neuro

- 'With contrast' neuro exams only performed following neurorad approval after discussion with the ordering team.
- Reduce contrast amounts 20% to 40% from pre-shortage exam – see wiki for details. Prefer dual energy or low kV study (med/small protocols, even in larger patients)
- If using single dose 100ml vials, use only one vial for exam if total typical contrast dose is <125ml. (CT neck, CT maxiface, CT orbit)

- Ulrich injectors, reduce the amount of contrast administered for all non-perfusion exams by 20%. (Perfusion volumes remain the same)

#### Protocolling considerations:

- Indications that **should have** contrast:
  1. Stroke Code
  2. Trauma CTA neck/head exams limited to those with identified risk factors (c-spine / Le Fort fractures) or high degree of clinical suspicion (significant mechanism) and only after discussion with neurorad.
  3. Infection/Abscess in neck
  4. Head and neck cancer first post-treatment exam
- Indications that **can be scanned non-con**:
  1. Altered mental status / AMS
  2. Dizziness/ Weakness
  3. Neck mass/lump without risk factors (outpatients)
  4. orbit for proptosis
  5. Lymphoma
- Indications to **consider pushing to MR**:
  1. MRI eligible non-"stroke code" ER CTA/Perfusion (quick stroke vs stroke deluxe)
  2. Tinnitus
  3. Altered mental status / AMS - MRI fast stroke
  4. Dizziness/ Weakness - MRI fast stroke
  5. F/U Aneurysm - MRA
  6. F/U Stenosis - MRA
  7. Head and neck cancer other follow-up - Discuss w/ reading room, CT with contrast vs. MRI vs. delay 45 days for annual follow-up exams
  8. Head and neck cancer initial exam - Discuss w/ reading room, CT with contrast vs. MRI
  9. Head and neck cancer – recurrence suspected - Discuss w/ reading room, CT with contrast vs. MRI

<b>(Ulrich) Routine heads/facial trauma/orbit/pituitary gland/tbone</b>		
<b>Weight Ranges</b>	<b>Contrast Dosage</b>	<b>Injection Rate</b>
<b>Less than 200 lbs. (Less than 90 kg)</b>	<b>88 mL Iohexol 350 mgI/mL</b>	<b>2 mL/sec</b>
<b>200-300 lbs (90-136 kg)</b>	<b>100 mL Iohexol 350 mgI/mL</b>	<b>2 mL/sec</b>
<b>More than 300 lbs (More than 136 kg)</b>	<b>110 mL Iohexol 350 mgI/mL</b>	<b>2 mL/sec</b>
<b>Begin scanning 5 minutes after end of injection (~6 minutes from start of injection)</b>		

<b>(Medrad) Routine heads/facial trauma/orbit/pituitary gland/tbone</b>			
<b>Weight Ranges</b>	<b>Volume to load</b>	<b>Contrast Dosage</b>	<b>Injection Rate</b>
<b>All patient weights (adult)</b>	<b>100 ml (1 x 100ml bottle or 2x50 ml bottles at 350 mgI/cc concentration)</b>	<b>100 mL Iohexol 350 mgI/mL</b>	<b>2 mL/sec</b>
<b>Begin scanning 5 minutes after end of injection (~6 minutes from start of injection)</b>			

<b>(Ulrich) necks for adults (peds unchanged)</b>		
<b>Weight Ranges</b>	<b>Contrast Dosage</b>	<b>Injection Rate</b>
<b>Less than 200 lbs (Less than 90 kg)</b>	<b>43 mL Iohexol 350 mgI/mL PAUSE 60 SECONDS AND THEN 29 mL Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>Contrast: 2 mL/sec NaCl flush: 3 mL/sec</b>
<b>200-300 lbs (90-136 kg)</b>	<b>54 mL Iohexol 350 mgI/mL PAUSE 60 SECONDS AND THEN 37 mL Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>Contrast: 2.5 mL/sec NaCl flush: 3 mL/sec</b>
<b>More than 300 lbs (More than 136 kg)</b>	<b>62 mL Iohexol 350 mgI/mL PAUSE 60 SECONDS AND THEN 40 mL Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>Contrast: 3 mL/sec NaCl flush: 3 mL/sec</b>
<b>Delay for Adults: (18 Yrs and Up) 110 sec after start of injection</b>		

<b>(Medrad) necks for adults (peds unchanged)</b>			
<b>Weight Ranges</b>	<b>Volume to load (350 mgI/ml concentration)</b>	<b>Contrast Dosage</b>	<b>Injection Rate</b>
<b>Less than 200 lbs (Less than 90 kg)</b>	<b>100 ml (1 x 100ml bottle or 2x50 ml bottles at 350 mgI/cc concentration)</b>	<b>51 mL Iohexol 350 mgI/mL PAUSE 60 SECONDS AND THEN 34 mL Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>Contrast: 2 mL/sec NaCl flush: 3 mL/sec</b>
<b>200-300 lbs (90-136 kg)</b>	<b>100 ml (1 x 100ml bottle or 2x50 ml bottles at 350 mgI/cc concentration)</b>	<b>60 mL Iohexol 350 mgI/mL PAUSE 60 SECONDS AND THEN 40 mL Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>Contrast: 2.5 mL/sec NaCl flush: 3 mL/sec</b>
<b>More than 300 lbs (More than 136 kg)</b>	<b>100 ml (1 x 100ml bottle or 2x50 ml bottles at 350 mgI/cc concentration)</b>	<b>60 mL Iohexol 350 mgI/mL PAUSE 60 SECONDS AND THEN 40 mL Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>Contrast: 3 mL/sec NaCl flush: 3 mL/sec</b>
<b>Delay for Adults: (18 Yrs and Up) 110 sec after start of injection</b>			

<b>(Ulrich) Adult CTA phase of stroke work up</b>		
<b>Weight Ranges</b>	<b>Contrast Dosage</b>	<b>Injection Rate</b>
<b>Less than 200 lbs (Less than 90 kg)</b>	<b>70 mL of Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>4 mL/sec</b>
<b>200-300 lbs (90-136 kg)</b>	<b>90 mL of Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>5 mL/sec</b>
<b>More than 300 lbs (More than 136 kg)</b>	<b>108 mL of Iohexol 350 mgI/mL + 50 mL NaCl flush</b>	<b>5 mL/sec</b>
<b>(Ulrich) adult perfusion phase of stroke work up</b>		
<b>Weight Ranges</b>	<b>Contrast Dosage</b>	<b>Injection Rate</b>
<b>Less than 200 lbs (Less than 90 kg)</b>	<b>40 mL of Iohexol 350 mgI/mL + 30 mL NaCl flush</b>	<b>5 mL/sec</b>
<b>200-300 lbs (90-136 kg)</b>	<b>40 mL of Iohexol 350 mgI/mL + 30 mL NaCl flush</b>	<b>5.5 mL/sec</b>
<b>More than 300 lbs (More than 136 kg)</b>	<b>40 mL of Iohexol 350 mgI/mL + 30 mL NaCl flush</b>	<b>5.5 mL/sec</b>

<b>(Medrad) CTA phase of stroke</b>				
<b>Patient Weight (lbs)</b>	<b>Volume to load (ml)</b>	<b>How much to inject (Contrast Volume (mL) at 350 mg/mL concentration)</b>	<b>Saline Volume (mL)</b>	<b>Injection Flow Rate (ml/s)</b>
<b>all adults</b>	<b>100 ml (1x bottle of 100 ml, or 2 x bottles of 50 ml)</b>	<b>Inject 60 ml for CTA phase</b>	<b>50 ml for CTA flush, 30 ml for perfusion flush</b>	<b>5 ml/s</b>
<b>(Medrad) perfusion phase of stroke work up</b>				
<b>all adults</b>	<b>load once for CTA and perfusion phases (see above)</b>	<b>inject 40 ml for perfusion phase</b>	<b>30 ml for perfusion flush</b>	<b>5 ml/s</b>

## Chest

- Can do most exams without contrast unless for clinical trial.

Protocolling considerations:

- Indications that **should have** contrast:

- High energy Trauma with concern for vascular injury
- PE

- Indications that **can be scanned non-con**

- Trauma chests can mostly be done without contrast. (exception= high energy trauma)
  - Falls from standing, etc, noncon (if CT at all) usually suffices.

Indications to **consider pushing to MR**:

- PE - Do MRA for PE rather than CT and if they want to look at the lungs do a noncontrast chest CT afterwards.

## Abdomen

- Cup on Table no longer required.
- If oral was indicated prior to the contrast shortage, oral would be indicated today.
- RENAL DONOR contrast volumes should NOT be altered/ reduced.

Protocolling considerations:

- Indications that **SHOULD have contrast**:

- Active Bleeder -with Rad approval
- High energy Trauma with suspicion for solid organ injury
- Pancreatic Cancer
- Pancreatic neuroendocrine tumor
- Pancreatitis
- Gross Hematuria pt  $\geq$  age 45
- Single-phase and multi-phase cancer follow up scans. Examples:

1. GI malignancies (Esophago-gastric, liver, pancreas, colorectal, GIST, Neuroendocrine)
2. GU malignancies (renal cell carcinoma, bladder cancer, known TCC, ovarian cancer, endometrial cancer and cervical cancer)
3. Other malignancies: melanoma, breast cancer, lung, liposarcoma
4. **EXCEPTIONS:** (scanned w/o contrast) Testicular cancer, lymphoma, myeloma, leukemia, prostate cancer.

■ Indications that **can be performed non-con:**

1. Cancer follow up for: testicular cancer, lymphoma, myeloma, leukemia, prostate cancer.
2. Abdominal Pain, Weight loss, Abscess, Diverticulitis, Obstruction, Distention, Post-op - oral only
3. Appendicitis
4. Hernia - with oral and valsalva
5. Hematoma/ Retroperitoneal Hematoma (no concern for active bleed)
6. Chrons with acute pain/ complication
7. Microscopic Hematuria patient < 45 years old
8. Bariatric Post-op, assess leak - 100-200mL oral
9. Post abscess drainage
10. Adrenal adenoma- if injection is required, consider MR

■ Indications to **consider pushing to MRI or US** (i.e., you should call RR to confirm scanning these in CT)

1. Adrenal adenoma patients that require injection should be pushed to MRI in most cases. In another words, if post non-con CT the patient would normally be a candidate for the enhanced phases, they should be pushed to MR.
2. Renal mass CT should be replaced with MRI or CEUS (Indications: Characterization and follow up of renal masses)
3. Pancreas transplant
4. Post-ablation follow-up, currently largely done with MRI, could use CEUS if needed (Indications: Patients after renal/liver ablation.)
5. CT Enterography, substitute MRE (largely our current practice) (Indications: Inflammatory bowel disease, suspected small bowel tumors)
6. Multiphasic Liver, and Renal CT for staging—consider substitution of MRI for evaluation (largely our clinical practice); if solitary liver lesions CEUS an alternative as well. (Indications: Incidental liver, renal mass characterization. Cirrhotic pts with concern for HCC consider MRI or US/CEUS)
7. Hepatic abscess consider US or MRI
8. Appendicitis: Consider MRI (validated protocol) or US in appropriate pts
9. Clot in filter or CT Venogram- consider MRV

**Do not use the contrast volumes on the wiki protocol pages, use the tables below for all non CTA exams.**

**Volumes shown on this page are reduced relative to "normal times"**

To convert between pounds (lbs), kilograms (kg), and or stones (st) see the weight conversion table.

All injections should be followed by a 50 mL saline flush. See the "IV Contrast Parameters" section of each protocol for more details.

This table is for users with the Ulrich multi-dose injector

This table uses an injection rate of 3 mL/sec

<b>(Ulrich) routine torso weight based</b>			
<b>Patient Weight (lbs)</b>	<b>Contrast Volume (mL) (300 mg/mL concentration)</b>	<b>Contrast Volume (mL) (350 mg/mL concentration)</b>	<b>Saline Volume (mL)</b>
<b>110 and less</b>	<b>60 (minimum amount to load)</b>	<b>50 (minimum amount to load)</b>	<b>50</b>
<b>120</b>	<b>63</b>	<b>54</b>	<b>50</b>
<b>130</b>	<b>68</b>	<b>59</b>	<b>50</b>
<b>140</b>	<b>73</b>	<b>63</b>	<b>50</b>
<b>150</b>	<b>78</b>	<b>67</b>	<b>50</b>
<b>160</b>	<b>83</b>	<b>71</b>	<b>50</b>
<b>170</b>	<b>88</b>	<b>76</b>	<b>50</b>
<b>180</b>	<b>93</b>	<b>80</b>	<b>50</b>
<b>190</b>	<b>98</b>	<b>84</b>	<b>50</b>
<b>200</b>	<b>104</b>	<b>89</b>	<b>50</b>
<b>210</b>	<b>110</b>	<b>94</b>	<b>50</b>
<b>220</b>	<b>115</b>	<b>99</b>	<b>50</b>
<b>230</b>	<b>120</b>	<b>103</b>	<b>50</b>
<b>240</b>	<b>125</b>	<b>107</b>	<b>50</b>
<b>250 and larger</b>	<b>128 (max amount to load)</b>	<b>110 (max amount to load)</b>	<b>50</b>

This table is for users with the Medrad single-dose injector

DISCLAIMER- the values between 130-190 lbs have not been reduced (logically there is no reason to reduce the volume and throw out the remainder)

This table uses an injection rate of 3 mL/sec



<b>(Medrad) routine torso weight based</b>			
<b>Patient Weight (lbs)</b>	<b>Volume to load (ml)</b>	<b>How much to inject (Contrast Volume (mL) at 350 mg/mL concentration)</b>	<b>Saline Volume (mL)</b>
<b>110 and less</b>	<b>1 bottle of 50 ml (minimum amount to load)</b>	<b>50 (minimum amount to inject)</b>	<b>50</b>
<b>120</b>	<b>1 bottle of 50 ml (minimum amount to load)</b>	<b>50 (minimum amount to inject)</b>	<b>50</b>
<b>130</b>	<b>100 ml (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>69</b>	<b>50</b>
<b>140</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>74</b>	<b>50</b>
<b>150</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>79</b>	<b>50</b>
<b>160</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>84</b>	<b>50</b>
<b>170</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>89</b>	<b>50</b>
<b>180</b>	<b>100 ml (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>94</b>	<b>50</b>
<b>190</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>99</b>	<b>50</b>
<b>200</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>210</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>220</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>230</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>240</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>250 and larger</b>	<b>150 (can be 100 ml + 50 ml bottles, or 3 50 ml bottles)</b>	<b>129 (max amount to inject)</b>	<b>50</b>

## CV

- Decrease the contrast dose used – For TAVR CTs on CT-4 or EMH (Revolution Frontier or HD Discovery 750), patients with BMI < 30 should get 125 mL (instead of 150 mL).

Protocolling considerations:

- Indications that **can be performed non-con:**

1. Yearly follow-up CTA chest for aortic sizing or aneurysm (without history of dissection, aortic stenting, or aortic surgery) can get the maximum diameter from a gated non-contrast CT.

■ Indications to **consider pushing to MRI** (call CV RR to discuss if you see one of these orders):

1. Lower extremity run off in patients for claudication and no history of stenting
2. Thoracic outlet syndrome

## MSK

Do not use the contrast volumes on the wiki protocol pages, use the tables below for all non CTA exams.

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To convert between pounds (lbs), kilograms (kg), and or stones (st) see the weight conversion table.

All injections should be followed by a 50 mL saline flush. See the "IV Contrast Parameters" section of each protocol for more details.

This table is for users with the Ulrich multi-dose injector

This table uses an injection rate of 3 mL/sec

<b>(Ulrich) MSK</b>			
<b>Patient Weight (lbs)</b>	<b>Contrast Volume (mL) (300 mg/mL concentration)</b>	<b>Contrast Volume (mL) (350 mg/mL concentration)</b>	<b>Saline Volume (mL)</b>
<b>110 and less</b>	<b>60 (minimum amount to load)</b>	<b>50 (minimum amount to load)</b>	<b>50</b>
<b>120</b>	<b>63</b>	<b>54</b>	<b>50</b>
<b>130</b>	<b>68</b>	<b>59</b>	<b>50</b>
<b>140</b>	<b>73</b>	<b>63</b>	<b>50</b>
<b>150</b>	<b>78</b>	<b>67</b>	<b>50</b>
<b>160</b>	<b>83</b>	<b>71</b>	<b>50</b>
<b>170</b>	<b>88</b>	<b>76</b>	<b>50</b>
<b>180</b>	<b>93</b>	<b>80</b>	<b>50</b>
<b>190</b>	<b>98</b>	<b>84</b>	<b>50</b>
<b>200</b>	<b>104</b>	<b>89</b>	<b>50</b>
<b>210</b>	<b>110</b>	<b>94</b>	<b>50</b>
<b>220</b>	<b>115</b>	<b>99</b>	<b>50</b>
<b>230</b>	<b>120</b>	<b>103</b>	<b>50</b>
<b>240</b>	<b>125</b>	<b>107</b>	<b>50</b>
<b>250 and larger</b>	<b>128 (max amount to load)</b>	<b>110 (max amount to load)</b>	<b>50</b>

This table is for users with the Medrad single-dose injector

DISCLAIMER- the values between 130-190 lbs have not been reduced (logically there is no reason to reduce the volume and throw out the remainder)

This table uses an injection rate of 3 mL/sec

<b>(Medrad) MSK</b>			
<b>Patient Weight (lbs)</b>	<b>Volume to load (ml)</b>	<b>How much to inject (Contrast Volume (mL) at 350 mg/mL concentration)</b>	<b>Saline Volume (mL)</b>
<b>110 and less</b>	<b>1 bottle of 50 ml (minimum amount to load)</b>	<b>50 (minimum amount to inject)</b>	<b>50</b>
<b>120</b>	<b>1 bottle of 50 ml (minimum amount to load)</b>	<b>50 (minimum amount to inject)</b>	<b>50</b>
<b>130</b>	<b>100 ml (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>69</b>	<b>50</b>
<b>140</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>74</b>	<b>50</b>
<b>150</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>79</b>	<b>50</b>
<b>160</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>84</b>	<b>50</b>
<b>170</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>89</b>	<b>50</b>
<b>180</b>	<b>100 ml (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>94</b>	<b>50</b>
<b>190</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>99</b>	<b>50</b>
<b>200</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>210</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>220</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>230</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>240</b>	<b>100 (can be 1 100 ml bottle or 2 50 ml bottles)</b>	<b>100</b>	<b>50</b>
<b>250 and larger</b>	<b>150 (can be 100 ml + 50 ml bottles, or 3 50 ml bottles)</b>	<b>129 (max amount to inject)</b>	<b>50</b>

## Peds

Please do not change pediatric flow rates.

Pediatric patients weighing more than 120 lbs. please refer to the adult weight based tables.

Pediatric injections for routine torso imaging use an injection rate of 1.5 - 3 mL/sec

<b>(Ulrich) routine torso weight based pediatrics</b>			
<b>Patient Weight (lbs)</b>	<b>Patient Weight (kg)</b>	<b>Contrast Volume (mL) (350 mg/mL concentration)</b>	<b>Saline Volume (mL)</b>
<b>11</b>	<b>5</b>	<b>7</b>	<b>30</b>
<b>22</b>	<b>10</b>	<b>14</b>	<b>30</b>
<b>33</b>	<b>15</b>	<b>22</b>	<b>30</b>
<b>44</b>	<b>20</b>	<b>29</b>	<b>30</b>
<b>55</b>	<b>25</b>	<b>36</b>	<b>30</b>
<b>66</b>	<b>30</b>	<b>43</b>	<b>30</b>
<b>77</b>	<b>35</b>	<b>51</b>	<b>30</b>
<b>88</b>	<b>40</b>	<b>58</b>	<b>30</b>
<b>99</b>	<b>45</b>	<b>65</b>	<b>30</b>
<b>110</b>	<b>50</b>	<b>72</b>	<b>30</b>
<b>121</b>	<b>55</b>	<b>79</b>	<b>30</b>

<b>(medrad) routine torso weight based pediatrics</b>			
<b>Patient Weight (lbs)</b>	<b>Patient Weight (kg)</b>	<b>Contrast Volume (mL) (350 mg/mL concentration)</b>	<b>Saline Volume (mL)</b>
<b>11</b>	<b>5</b>	<b>7 (load 50 ml or less bottle)</b>	<b>30</b>
<b>22</b>	<b>10</b>	<b>14 (load 50 ml or less bottle)</b>	<b>30</b>
<b>33</b>	<b>15</b>	<b>22 (load 50 ml or less bottle)</b>	<b>30</b>
<b>44</b>	<b>20</b>	<b>29 (load 50 ml or less bottle)</b>	<b>30</b>
<b>55</b>	<b>25</b>	<b>36 (load 50 ml or less bottle)</b>	<b>30</b>
<b>66</b>	<b>30</b>	<b>50 (load 50 ml bottle)</b>	<b>30</b>
<b>77</b>	<b>35</b>	<b>50 (load 50 ml bottle)</b>	<b>30</b>
<b>88</b>	<b>40</b>	<b>50 (load 50 ml bottle)</b>	<b>30</b>
<b>99</b>	<b>45</b>	<b>76.5 (load 100 ml bottle)</b>	<b>30</b>
<b>110</b>	<b>50</b>	<b>85 (load 100 ml bottle)</b>	<b>30</b>
<b>121</b>	<b>55</b>	<b>93.5 (load 100 ml bottle)</b>	<b>30</b>

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