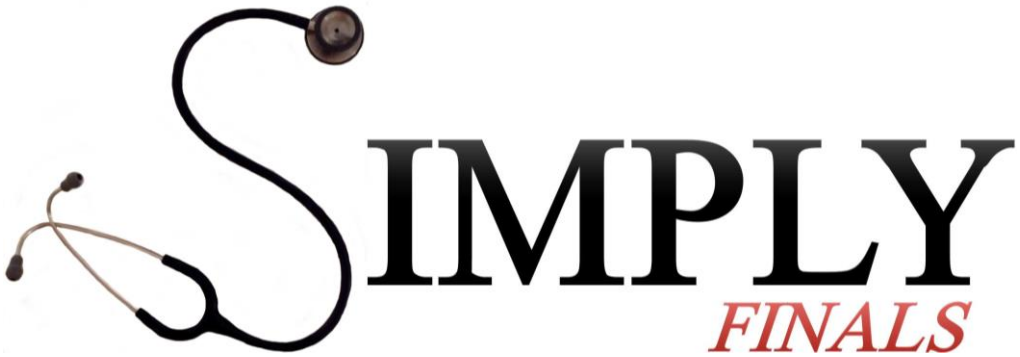
SIMPLY…. Fluids

Dr William Dooley



Plan

- Fluid management
  - Resuscitation
  - Routine Maintenance
  - Replacement
  - Redistribution
  - **Reassessment**

- Common Errors ☹
- Calculations ☺

SIMPLY FINALS

Assessment

?ORAL vs. IVF

- **History**

  Limited intake — High losses
  Co-morbitities — Symptoms e.g. thirst

- **Examination**

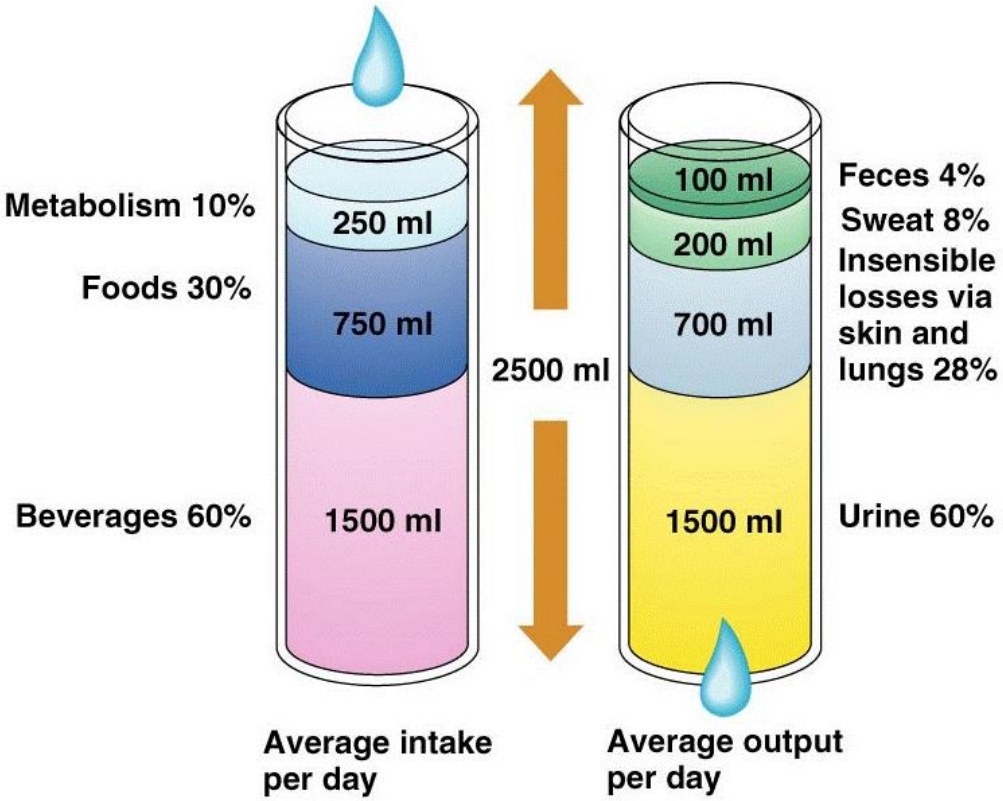
  A-
  B- RR >20/min
  C- SBP <100mmHg HR >90 bpm
  CR >2secs — Cold peripherally — JVP
  D- UO < 0.5 ml/kg/hr
  E- Dry mucosae

- **Investigation**

  Bedside: Wt (IBW) — Fluid Balance
  Bloods: FBC/U+E
  Imaging: CXR

SIMPLY FINALS

Fluid balance



The patient was placed on a fluid balance chart.

1

24 Hour Fluid Balance Chart

01:00hrs - 24:00hrs

The Leeds Teaching Hospitals NHS Trust

WPG562

Patient's Name JAMES JONES
Ward 83
Consultant BIRT
Date of Birth 01/01/78 Unit No 666661

Notes

Date/ Time	Intake (in mls.)					Output (in mls.)					
	Oral	Enteral Feed/ NG Feed	Parenteral		Running Total	Urine	Aspirate/ Suction	Other			Running Total
			IV	Blood Product							
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											
11											
12											
13											
14											
15		RETURNED FROM THEATRE.									
16			83			35					
17			83			20					
18			CANNULA FALLOUT			20					
19						15					
20						10					
21						15					
22						12					
23						15					
00											
Total											

Total Intake mls. Total Output mls.

Type of fluid and rate

- Crystalloids

Clear fluids- water+electrolytes

  - 0.9% Normal Saline
  - Dextrose
  - Hartmann's

	0.9% Normal saline	Hartmann	5% glucose
Na	154 mmol	131 mmol	0
K	0	5 mmol	0
Cl	154 mmol	111 mmol	0
Osmol	303 mosm/l	279 mosm/l	253 mosm/l
Other	nil	Lactate 29 Calcium 2	Glucose 50g/l

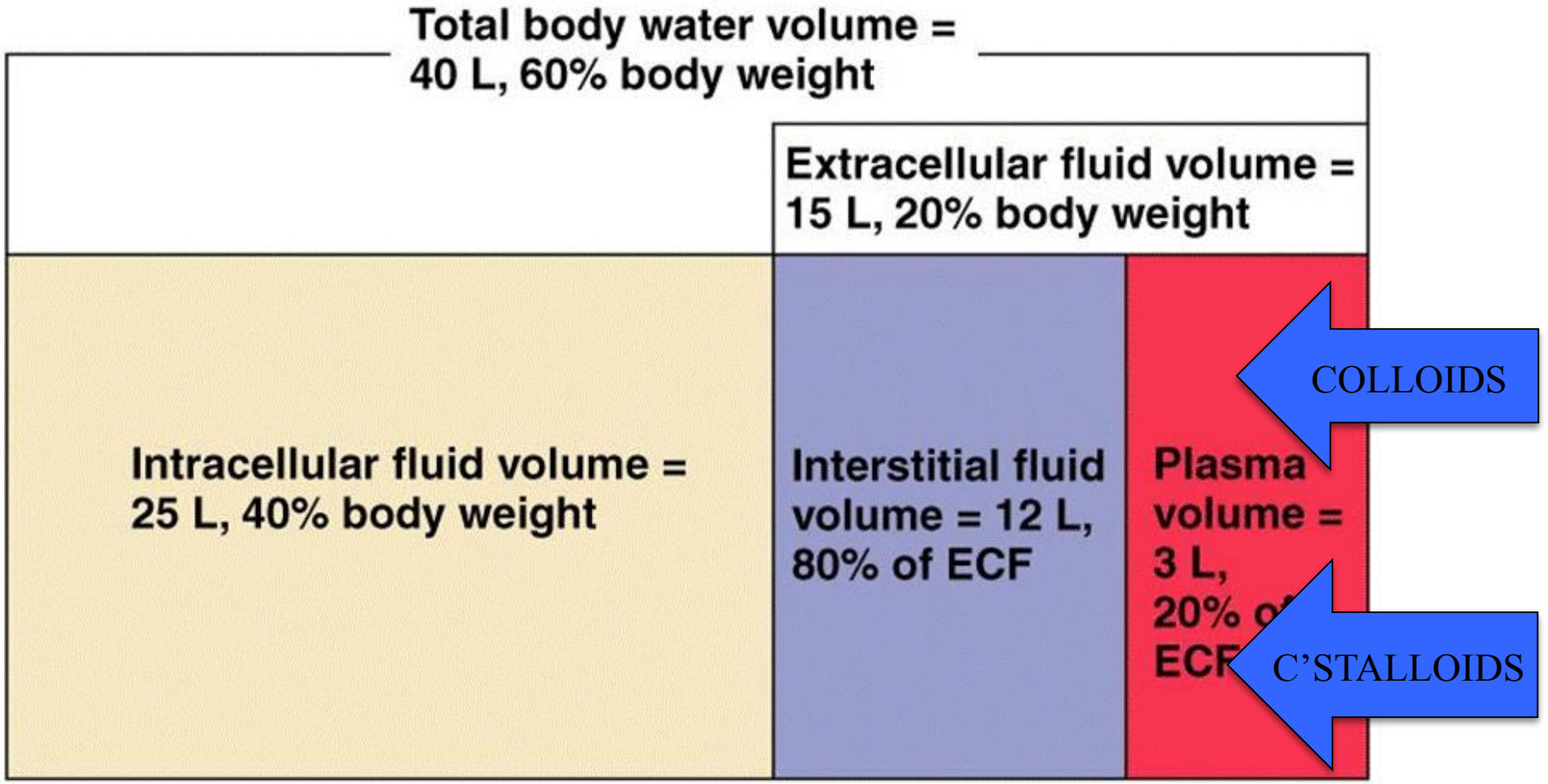
- Colloids

Gelatinous- particles suspended in solution

  - Volplex
  - Gelofusion
  - Blood

SIMPLY FINALS

Fluid compartments



SIMPLY FINALS

Resuscitation

Assess- ABCDE

IF NO OVERLOAD SIGNS…

*** FLUID CHALLENGE ***

250-500mls Crystalloid

Reassess

Further 250-500mls bolus until 2L given

REASSESS

Replacement and Redistribution

COMPLEX ISSUES → Senior input

- Oedema/Sepsis
- Renal/liver/cardiac failure
- Post op retention/redistribution
- Malnourished/re-feeding

Maintenance Requirements

Fluid: 25-30 ml/kg/day
Sodium: 1-2mmol /kg/day
K^{+}: 0.5-1mmol /kg/day
+ *Replacements*

Example… 70kg per day

- Fluid: 1750-2100ml
- Sodium: 70-140mmol
- Potassium: 35-70mmol

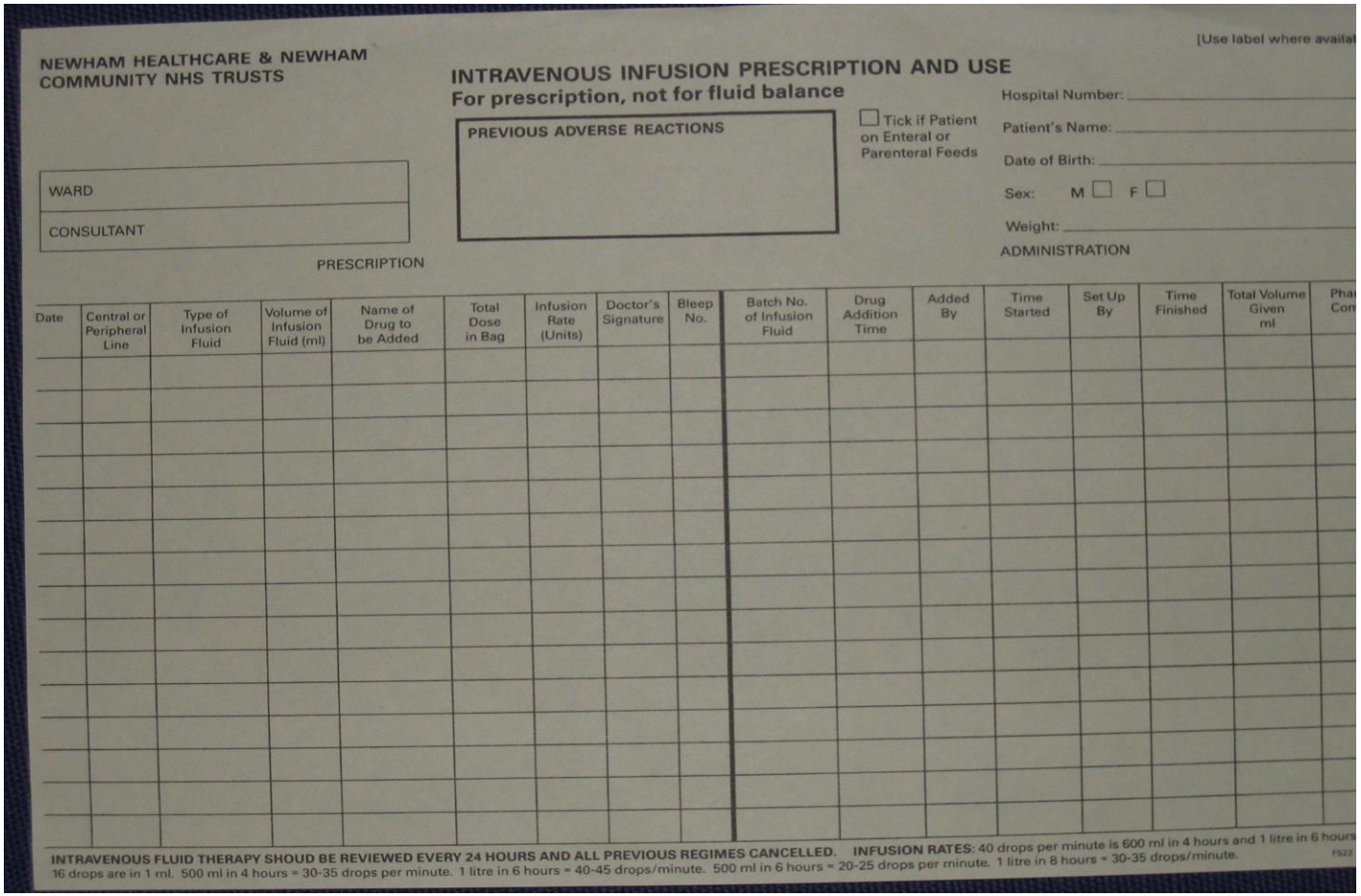
e.g. 1 salt + 2 sweet
See NICE Guidance-

DOES PATIENT NEED IV FLUID???

	0.9% Normal saline	**Hartmanns**	5% glucose
Na	154 mmol	131 mmol	0
K	0	5 mmol	0
Cl	154 mmol	111 mmol	0
Osmol	303 mosm/l	279 mosm/l	253 mosm/l
Other	nil	Lactate 29 Calcium 2	Glucose 50g/l

SIMPLY FINALS

Fluid prescription



NEWHAM HEALTHCARE & NEWHAM COMMUNITY NHS TRUSTS

INTRAVENOUS INFUSION PRESCRIPTION AND USE
For prescription, not for fluid balance

[Use label where availa

PREVIOUS ADVERSE REACTIONS

☐ Tick if Patient on Enteral or Parenteral Feeds

Hospital Number: _____
Patient's Name: _____
Date of Birth: _____
Sex: M ☐ F ☐
Weight: _____

WARD
CONSULTANT

PRESCRIPTION

ADMINISTRATION

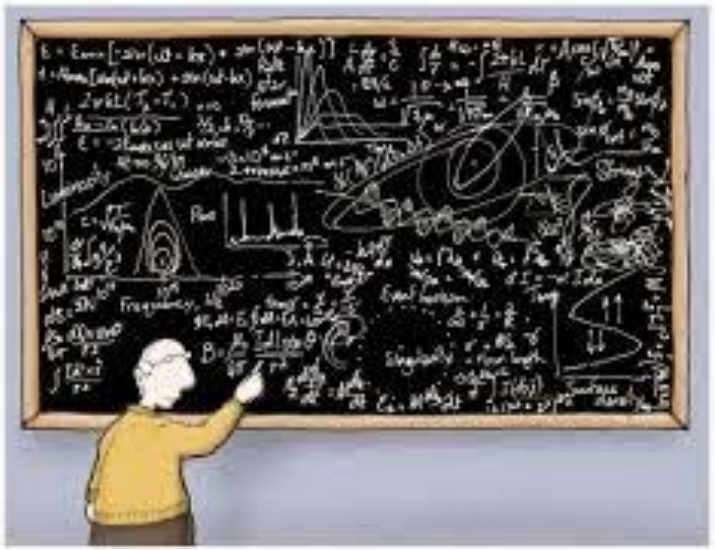
Date	Central or Peripheral Line	Type of Infusion Fluid	Volume of Infusion Fluid (ml)	Name of Drug to be Added	Total Dose in Bag	Infusion Rate (Units)	Doctor's Signature	Bleep No.	Batch No. of Infusion Fluid	Drug Addition Time	Added By	Time Started	Set Up By	Time Finished	Total Volume Given ml	Pha Con

INTRAVENOUS FLUID THERAPY SHOUD BE REVIEWED EVERY 24 HOURS AND ALL PREVIOUS REGIMES CANCELLED. **INFUSION RATES:** 40 drops per minute is 600 ml in 4 hours and 1 litre in 6 hours
16 drops are in 1 ml. 500 ml in 4 hours = 30-35 drops per minute. 1 litre in 6 hours = 40-45 drops/minute. 500 ml in 6 hours = 20-25 drops per minute. 1 litre in 8 hours = 30-35 drops/minute.

Prescribe for 24 hrs
Not for oncall team!

SIMPLY FINALS

Calculations



SIMPLY FINALS

Calculating Drip Rate

What is the drip rate (drops/minute) required for a unit of blood to run over 4 hours using giving set with drop factor of 20 drops/ml?

1 unit of blood = approx 400mls

Calculating Drip Rate

- **Drip rate (drops per minute)**
- Volume (ml)
- Time (***minute***)
- Drop Factor (drops per ml) or (gtt per ml)

Three different methods… use the one you're most comfortable with

SIMPLY FINALS

1. Know the Equation

What is the drip rate (drops/minute) required for a unit of blood to run over 4 hours using giving set with drop factor of 20 drops/ml?

$$\text{Drip rate} = \frac{\text{Volume}}{\text{Time}} \times \text{Drop Factor}$$

$$\text{Drip Rate} = \frac{400\text{mls}}{240\textbf{mins}} \times 20 \text{ gtt/ml}$$

$$= 33 \text{ drops / min}$$

$$= 32 \text{ drops / min} \quad \text{OR} \quad 8 \text{ drops / 15 sec}$$

SIMPLY FINALS

2. Think about the problem

- Drip rate is DROPS PER MINUTE
- This is TOTAL DROPS DIVIDED BY TIME
- TOTAL DROPS same as VOLUME x DROP FACTOR (as this is drops per ml)

What is the drip rate (drops/minute) required for a unit of blood to run over 4 hours using giving set with drop factor of 20 drops/ml?

TOTAL DROPS = VOLUME X DROP FACTOR = 400 X 20 = 8000

DRIP RATE = TOTAL DROPS / TIME = 8000 / 240 = 33 drops/min

3. Look at the units

Drip rate **(drops per minute)**

- Volume (ml)
- Time (minute)
- Drop Factor (drops per ml)

$$\text{Drip rate} \left(\frac{\text{Drops}}{\text{min}}\right) = \frac{\text{Volume}}{\text{Time}} \left(\frac{\text{ml}}{\text{mins}}\right) \times \text{Drop Factor} \left(\frac{\text{Drops}}{\text{ml}}\right)$$

$$\text{Drip Rate} = \frac{400\text{mls}}{240\textbf{mins}} \times 20 \text{ gtt/ml}$$

$$= 33 \text{ drops / min}$$

SIMPLY FINALS

Converting drip rate to ml/hour

What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20 drops/ml?

Transfusion Rate	**(Ml/hr)**
Drip rate	(Drops/minute)
Drop Factor	(Drops/ml)

1. Know the Equation

$$\text{Transfusion Rate} = \frac{\text{Drip Rate}}{\text{Drop Factor}}$$

What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20gtt/ml?

$$\text{Transfusion Rate} = \frac{40 \times 60}{20}$$

$$= 120 \text{ ml/hr}$$

SIMPLY FINALS

2. Think about the problem

What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20 drops/ml?

- 20 drops per ml
- Therefore 40 drops = 2ml
- Therefore 2ml per minute

- Therefore 2x60 = **120 ml per hour**

3. Look at the units

What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20 drops/ml?

Transfusion Rate **(Ml/hr)**
Drip rate (Drops/minute)
Drop Factor (Drops/ml)

$$\text{Ml/hr} = \frac{\text{drops}}{\text{hr}} \textbf{ divided by } \frac{\text{drops}}{\text{ml}} = \frac{\cancel{\text{drops}}}{\text{hr}} \times \frac{\text{ml}}{\cancel{\text{drops}}}$$

= 40 x 60 divided by 20

= 120 ml per hour

SIMPLY FINALS

Try these later…

What is the drip rate (drops/minute) required for a 1 litre bag of saline to run over 5 hours using giving set with drop factor of 10 drops/ml?

$$\text{Drip rate} = \frac{\text{Volume}}{\text{Time}} \times \text{Drop Factor}$$

$$\text{Drip rate} = \frac{1000}{60 \times 5} \times 10 = 33 \text{ gtt/min}$$

What is the transfusion rate in ml/hour of a blood transfusion being run at 20 drops/minute through a giving set with drop factor of 15 drops/ml?

$$\text{Transfusion Rate} = \frac{\text{Drip Rate}}{\text{Drop Factor}} = \frac{20 \times 60}{15} = 80 \text{ ml/hr}$$

SIMPLY FINALS

Calculations

1. 0.01% Adrenaline. How many grams of adrenaline are in 1 litre of saline?

- Same as 1:10,000 adrenaline
- So 1 unit adrenaline in 10,000 units saline
- Or 1g Adrenaline in 10,000ml saline
- So 0.1g in 1 litre
- (one decimal place to the right)

2. What should the urine output for a 80kg patient over 4 hours be?

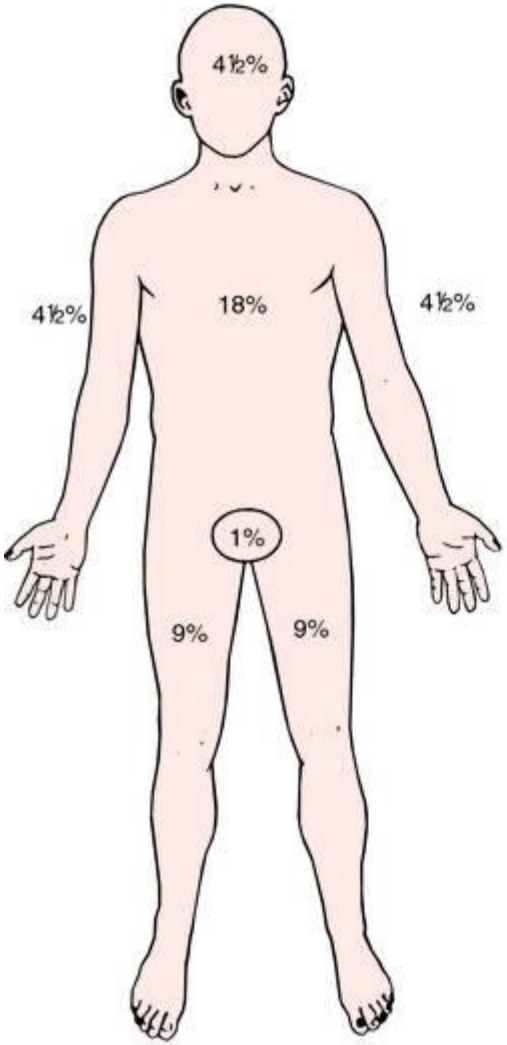
- UO > 0.5 ml / kg / hr
- So at least 0.5 x 80 x 4 = 160ml

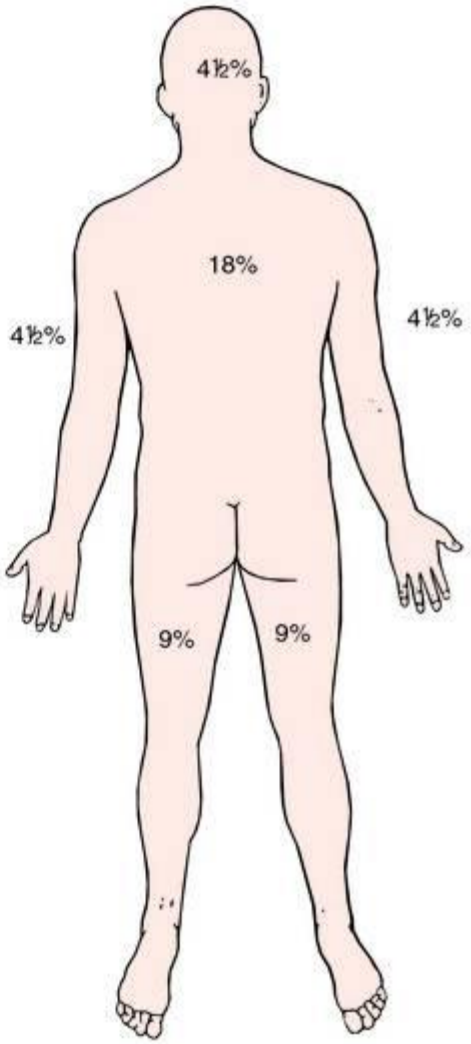
Burns

A patient presents with burns from fire. The burns are affecting both his arms, his face and head.

- **What percentage body area has been effected?**

Herndon Rule of 9s





Arm	9%
Head	9%
Neck	1%
Leg	18%
Anterior trunk	18%
Posterior trunk	18%

SIMPLY FINALS

Summary

- IV only if not PO
- Calculations…
  - Take your time!
  - Is your answer sensible?
- Practice!

Any Questions?

SIMPLY
FINALS