

# Education in renal nursing

## Ultrasound on the inferior vena cava for intravascular volume assessment

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# What evidence exists ?

Inferior vena cava ultrasound can be useful to assess volume status of a patient (Level II)<sup>1</sup>

Good correlation between CVP and IVCd and can provide a useful guide for noninvasive intravascular volume status assessment (Level II)<sup>2</sup>

14 Emergency department nurses without formal ultrasound training successfully performed IVC-US (longitudinal + transverse) on 42 patients with subsequent comparison to an expert (Level II)<sup>3</sup>

2 specialised nurses in a heart failure outpatient clinic performed IVC-US on 62 patients with subsequent comparison to a cardiologist (Level II)<sup>4</sup>

1 - Guiotto et al. (2010), Inferior vena cava collapsibility to guide fluid removal in slow continuous ultrafiltration: a pilot study, *Intensive Care Medicine*

2 - Thanakitcharu et al. (2013), Inferior vena cava diameter and collapsibility index: a practical non-invasive evaluation of intravascular fluid volume of critically ill patients, *Journal of the Medical Association of Thailand*

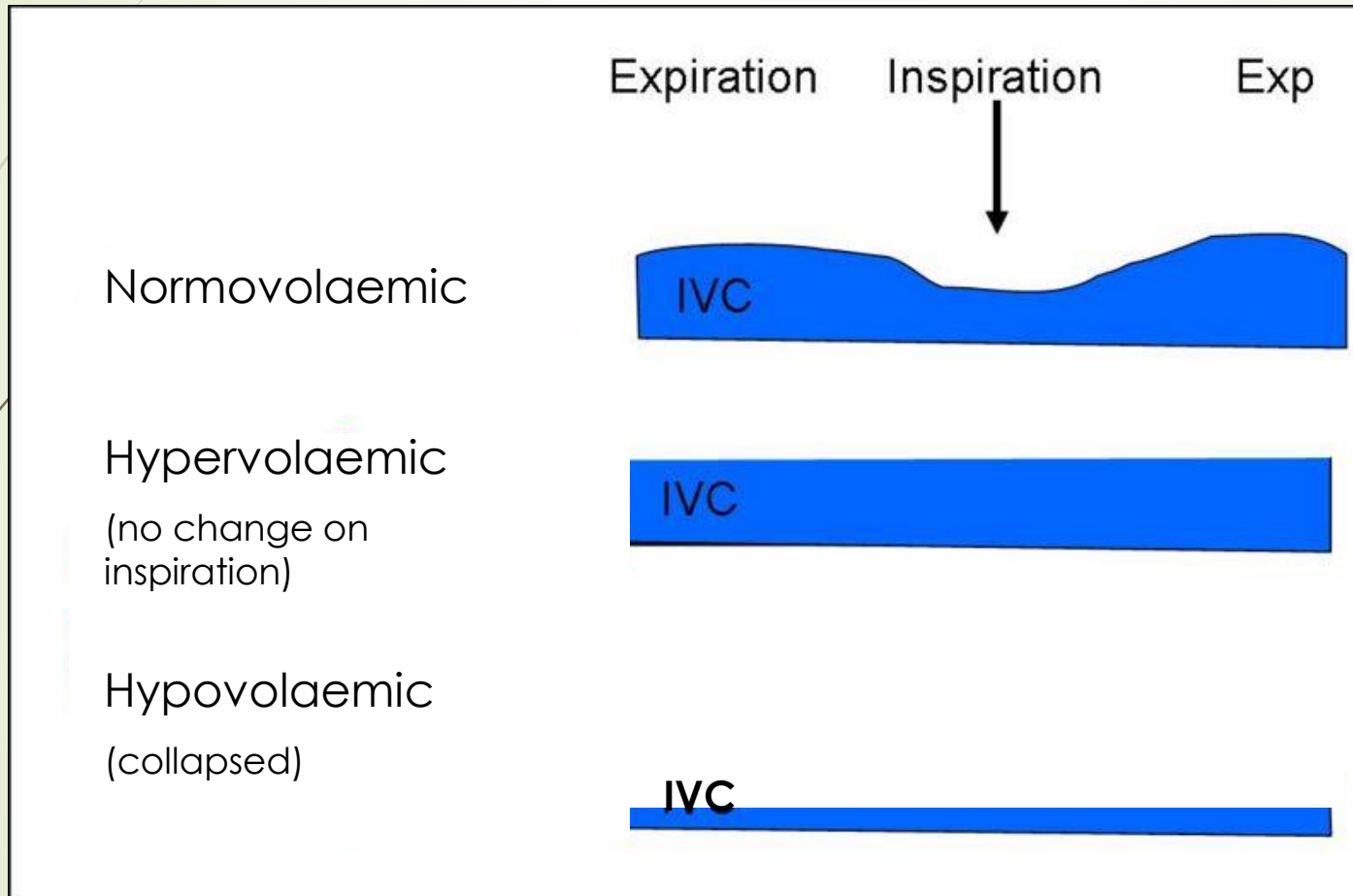
3 - De Lorenzo R.A. & Holbrook-Emmons (2014), Ultrasound measurement of inferior vena cava diameters by emergency department nurses, *Advanced Emergency Nursing Journal*

4 - Dalen H. et al. (2014), Feasibility and reliability of pocket-size ultrasound examinations of the pleural cavities and vena cava inferior performed by nurses in an outpatient heart failure clinic, *European Journal of Cardiovascular Nursing*

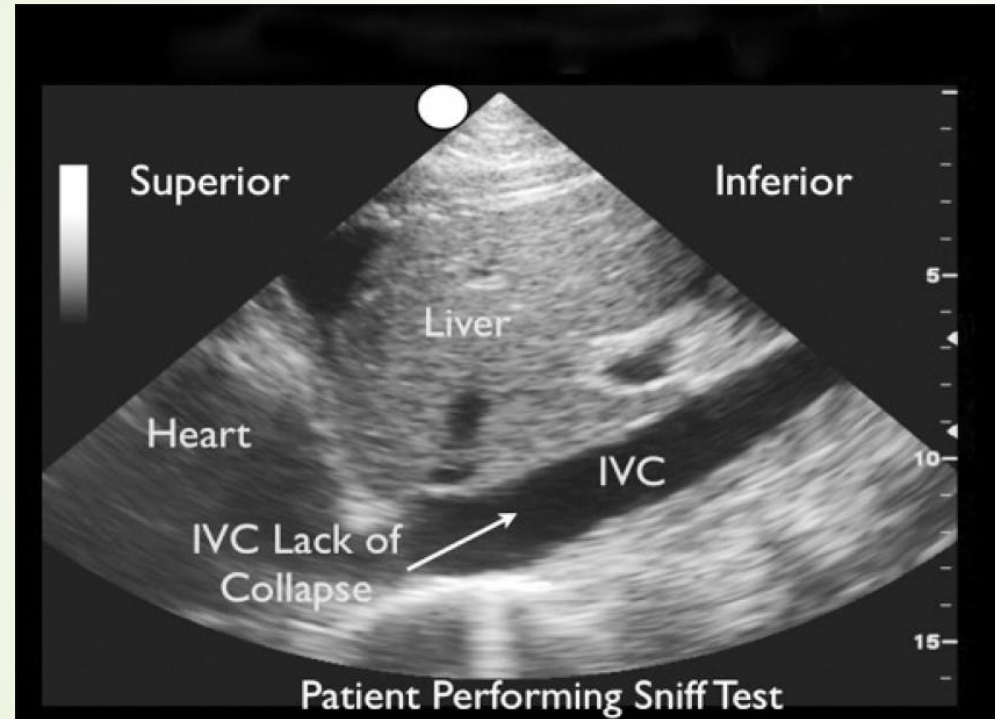


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# IVC - collapsibility



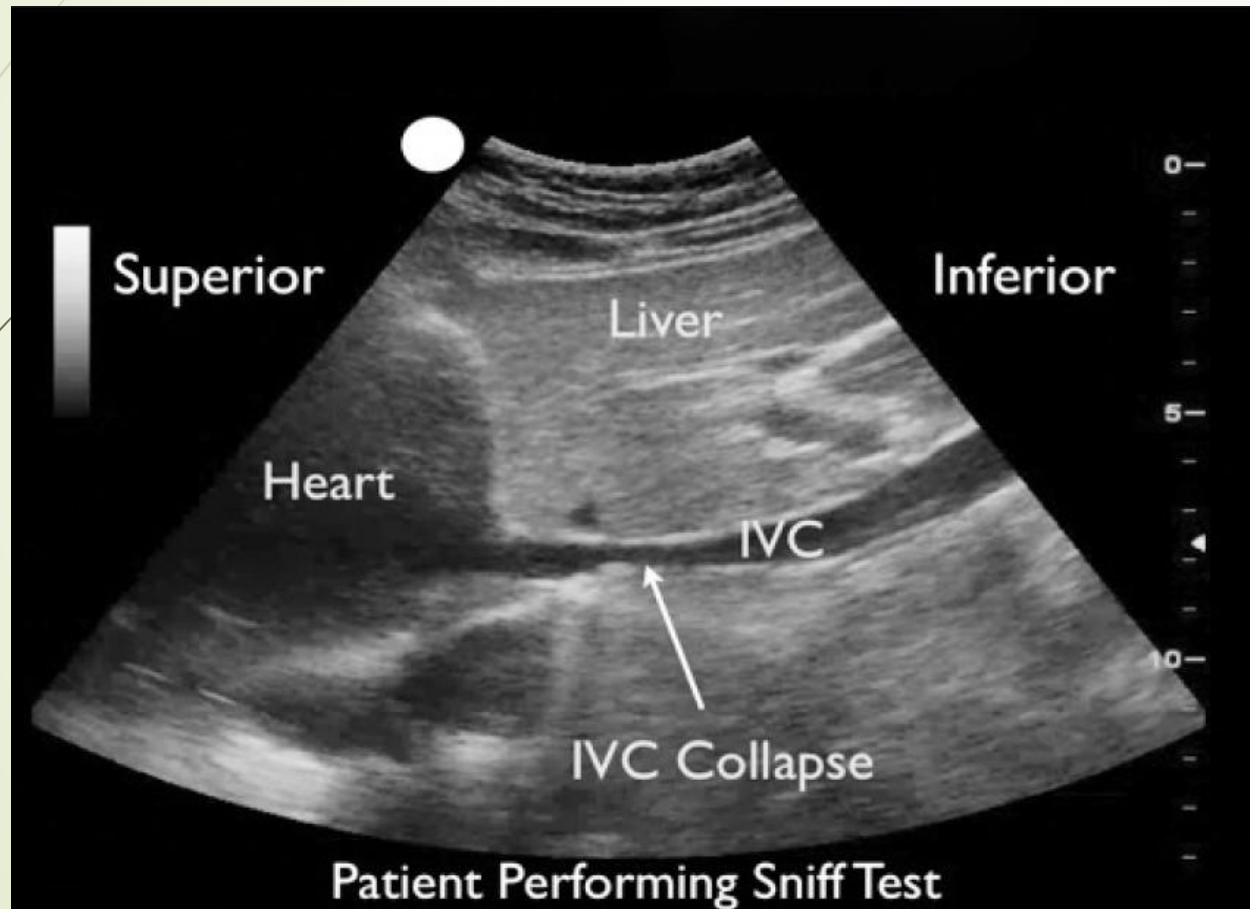
# Inferior vena cava ultrasound



IVC-US  
Hypervolaemic – no  
change in  
inspiration

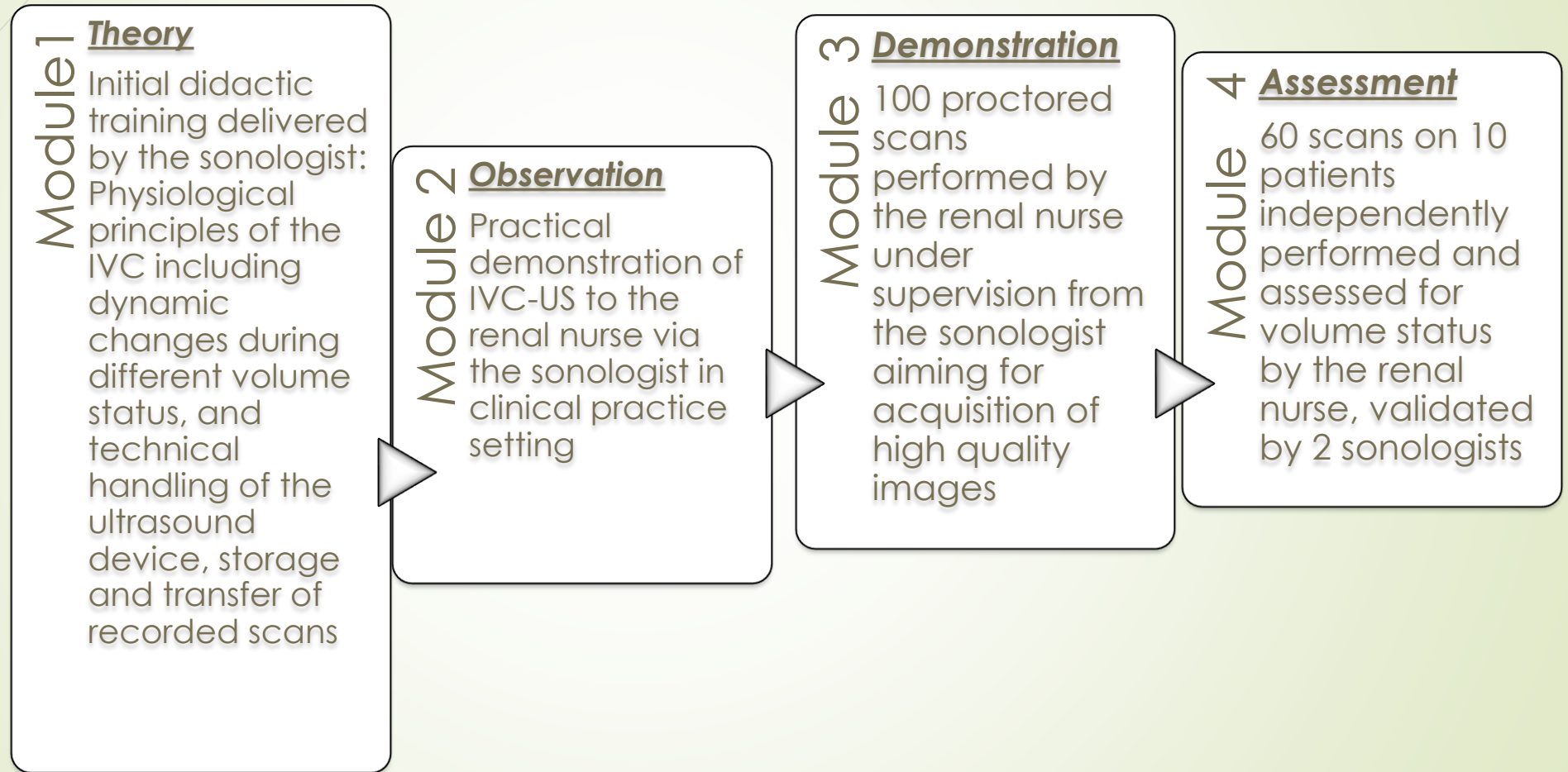
This method allows us a fluid assessment at *any stage* of the treatment

# Inferior vena cava ultrasound



IVC-US  
Hypovolaemic –  
collapsed IVC

# Educational programme

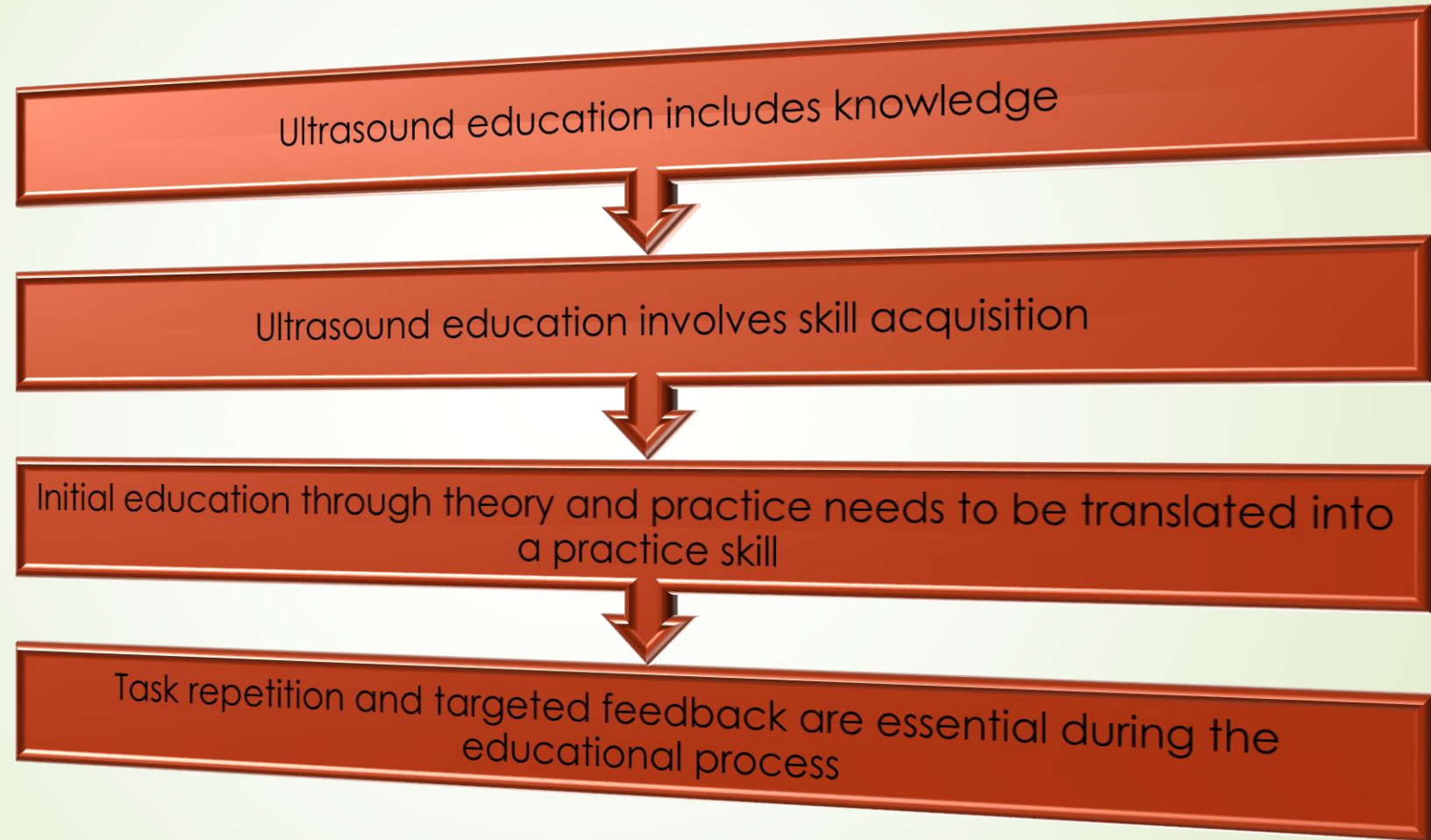


# Essential details:

|                                     | <b>IVC</b>                         | <b>Aorta</b>                      |
|-------------------------------------|------------------------------------|-----------------------------------|
| <b>vessel wall</b>                  | thinner                            | thicker (hyperechoic)             |
| <b>pulsates outwards</b>            | no                                 | yes                               |
| <b>shape</b>                        | rather slightly curved             | rather straight                   |
| <b>enters right atrium (RA)</b>     | yes                                | no                                |
| <b>hepatic vein visible</b>         | yes                                | no                                |
| <b>collapses during inspiration</b> | yes                                | no                                |
| <b>location</b>                     | rather to the patient's right side | rather to the patient's left side |

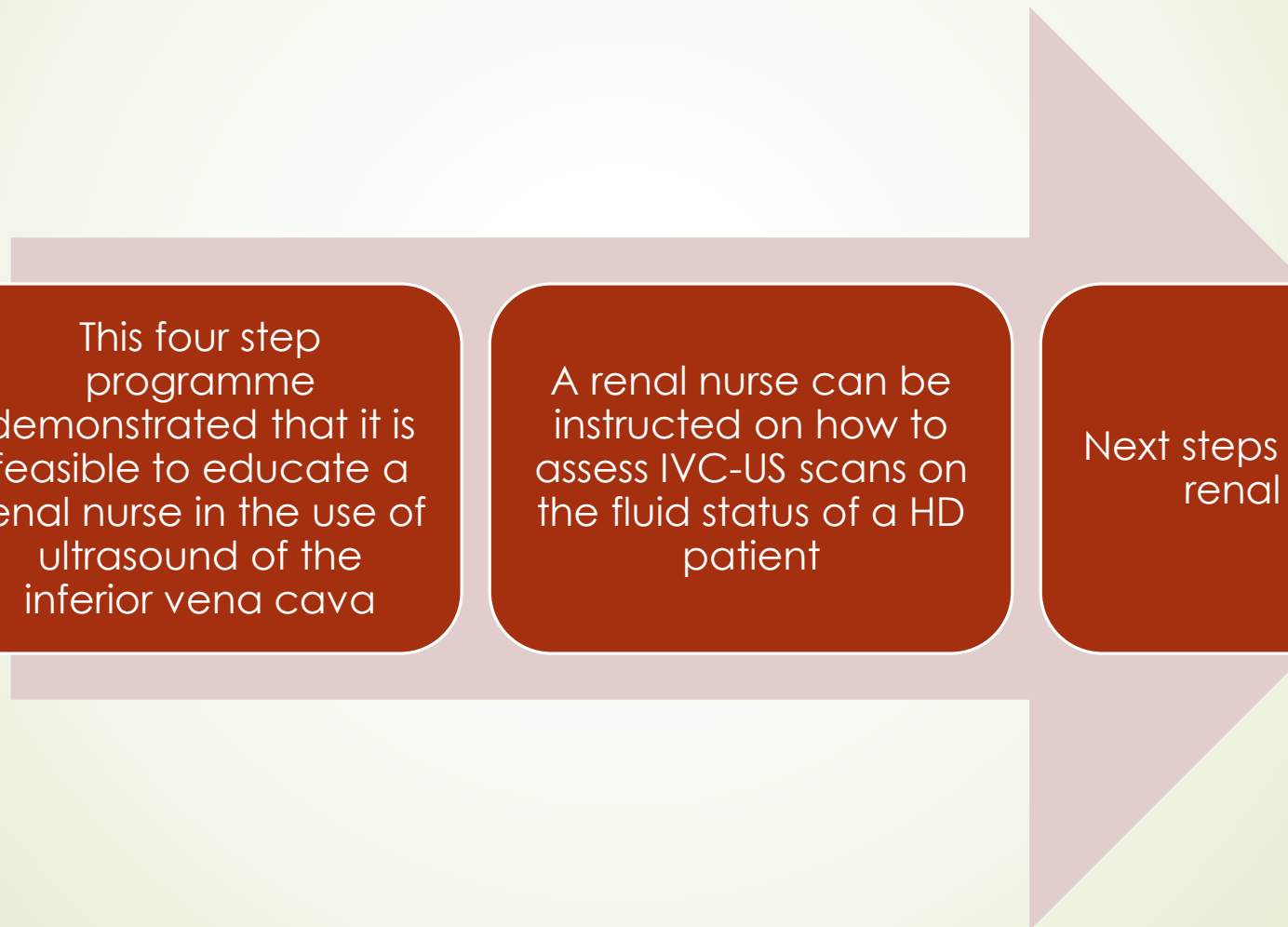


# Summary:





## Take home message:



This four step programme demonstrated that it is feasible to educate a renal nurse in the use of ultrasound of the inferior vena cava

A renal nurse can be instructed on how to assess IVC-US scans on the fluid status of a HD patient

Next steps ? train more renal nurses

Thank you for your attention !



Questions ?

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