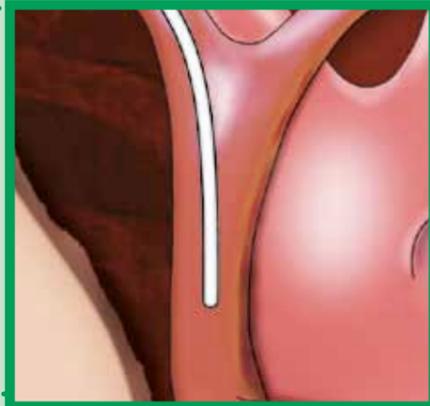
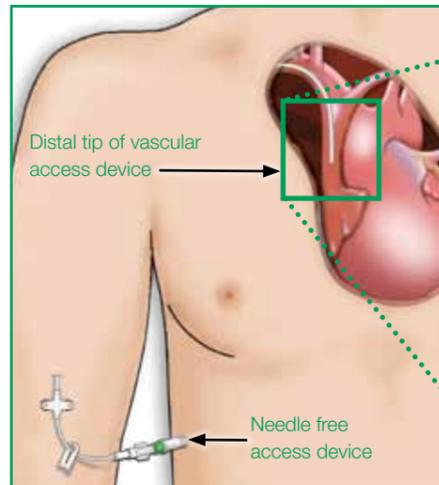
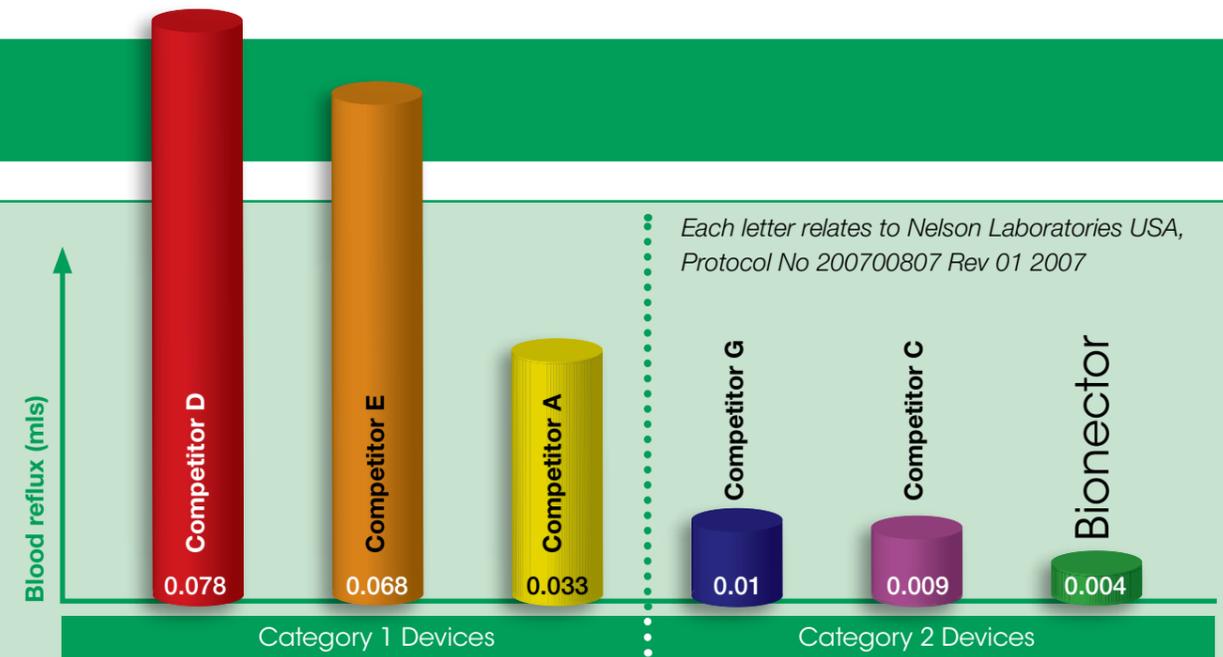


# Blood reflux study

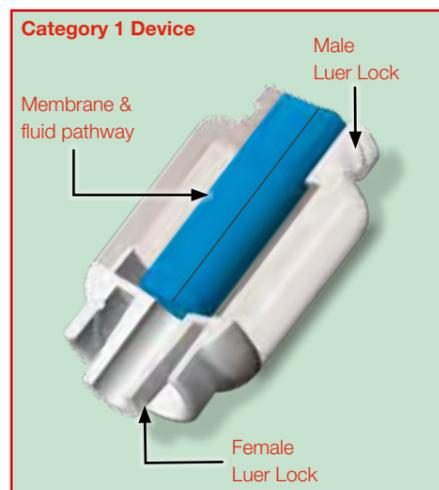


The effect that needle-free access devices have on the movement of fluid/blood at the distal tip of a vascular access device can be directly attributed to the design and mechanical functioning of the needle-free access device.

**Graph 1: Fluid displacement test**  
Nelson Laboratories USA, Protocol No 200700807 Rev 01 2007



Each letter relates to Nelson Laboratories USA, Protocol No 200700807 Rev 01 2007

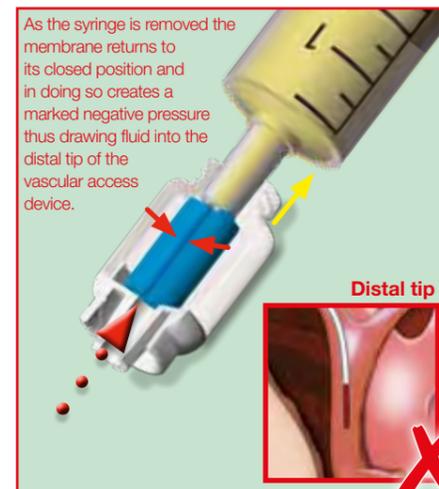
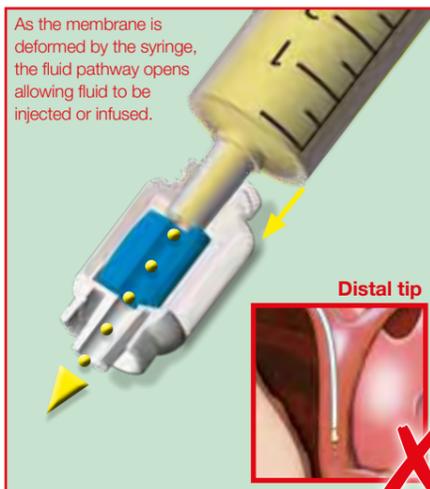
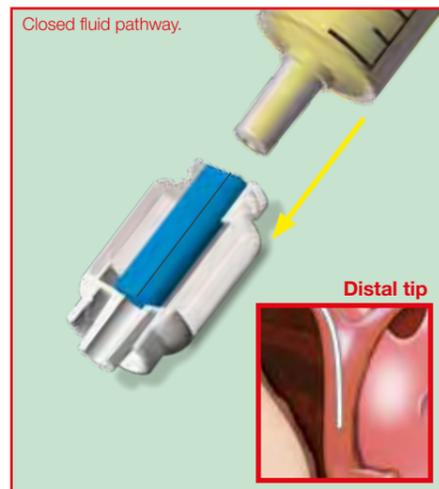


## Category 1 Device

Simple three component devices where the membrane is also the fluid pathway.

These simple devices work by allowing the tip of a syringe or the male luer of an infusion set to compress the membrane. During this compression process the membrane becomes deformed, thus opening the fluid pathway. When the membrane returns to its closed position following the removal of a syringe or the male luer of an infusion set, this act of the fluid pathway closing, creates a marked negative pressure. This means that the effect on fluid movement at the distal tip of the vascular access device is negative and thus blood is aspirated.

These devices are best described as 'negative pressure' needle-free access devices.

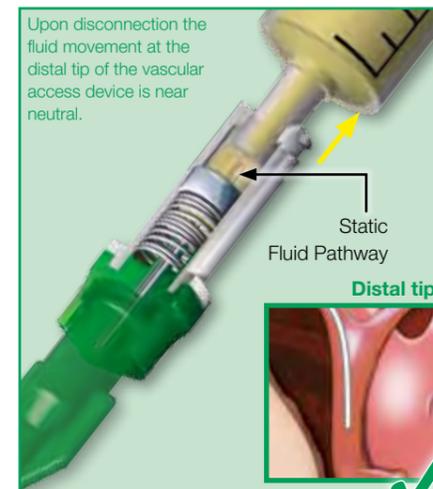


## Category 2 Device (Bionector)

Sophisticated multi-component devices where the membrane and fluid pathway are separate parts and the actuation of the membrane is controlled by a spring.

Bionector's fluid pathway remains physically unchanged during the connection and disconnection of a syringe or the male luer of an infusion set. This means that the effect on fluid movement at the distal tip of the vascular access device is near neutral.

These devices are best described as 'neutral pressure' needle-free access devices.



## What are the implications?

- A number of articles have been published linking the formation of Biofilm on the intra-luminal surface of vascular access devices when the surface comes into contact with blood<sup>1,2</sup>.
- Biofilm formation has also been linked with probable increased vascular access device bacterial colonization, and thus catheter-related bloodstream infection<sup>3</sup>.
- Blood reflux can increase the risk of vascular access device occlusion<sup>2</sup>. Obviously the smaller the vascular access device is in terms of the internal diameter of the lumen, the greater the length of catheter that is affected by blood reflux<sup>1</sup>.
- Neutral pressure needle-free devices can help prevent blood aspiration into infusion catheters<sup>4</sup>.

## References

1. Hadaway L. (2006) Technology of flushing vascular access devices. *Journal of Infusion Nursing*; Vol 29, No 3, pp. 137-145.
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4. Rosenthal K. (2006) Do needleless connectors increase bloodstream infection risk? *Nursing Management*; pp. 78-80.