



# Clinical Case Study

## Avon 6 EH™

Commissioned by: **WinnCare PAC** Company Registered in England and Wales. No 09918019.  
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### INTRODUCTION AND AIMS

The purpose of commissioning this evaluation and in turn supporting documentation, is to identify the clinical performance and suitability of WinnCare's latest heel mattress design. The Avon 6 EH™ was evaluated on a rather challenging set of patient circumstances, diagnosed with a Grade IV pressure ulcer. This paper was compiled with a suitably complex patient, in response to a contributing solution to the often over prescription of alternating systems and heel accessories, compiled with an increasing area of heel ulcer incidence.

I'm informed by the company that the design structure, follows a time when repeated approaches occurred by Tissue Viability and Moving and Handling experts, who could not find an appropriate solution, when a high or very high-risk static (or dynamic as in this case) needs to be prescribed. This was simply down to heel vulnerability on most products reportedly evaluated.

It is hoped that the content will assist others experiencing similar issues to include the considerations found, when choosing appropriate mattress selection and heel adaptations, whilst reviewing the holistic requirements for pressure ulcer prevention.

### PATIENT HISTORY/TRIAL OVERVIEW

Mr S is on the Avon 6 EH foam mattress, following repeated exposure and encountered problems with various designs of alternating mattress systems, provided from multiple suppliers and subject to appropriate risk assessments at the time. Sadly, he will not tolerate any type of dynamic system as he "had tried them all in hospital and didn't like the noise" and were "so uncomfortable". The patient also declined the use of "off loading boots".

The Avon 6 EH was specifically selected due to the aforementioned patient history. The fact that the product has been deemed suitable for use on patients "very high risk of pressure ulcer development or for use with existing wounds up to and including grade II/III, whilst under direct clinical supervision" by the manufacturer was also of consideration. However, the risk to extend this trail to that of a patient with a grade IV ulcer was unusual but necessary due to none tolerance of dynamic systems and as such falls inside "safeguarding considerations". The evaluation period is for 3 months for review with extension thereafter.

The patient is a 78-year-old male with a diagnosed grade IV pressure ulcer, who has full mental capacity. He has a history of hypertension, COPD and MS, suffers with severe depression, is doubly incontinent and requires full hoist transfer. Mr S' was quite ill and has poor nutritional intake at the start of the product evaluation but improved mid to latter part. He had access to the multi-disciplinary team involved throughout. The nature of the above also scored (Waterlow) to be that of 20+ (at time of assessment).



## IMAGE 1A GRADE IV PRESSURE ULCER

COMMENCEMENT OF TRIAL



### Notes:

The patient was referred to the vascular team for review due to the size of wound. The foot proved to be warm, with good capillary refill, monophasic pulses. Patient sadly declined to attend. Also had a tendency to sit with heels directly on the floor.

### “WHAT THE MANUFACTURER SAYS”

The clinically evaluated Avon 6 EH™ pressure reducing mattress, has been developed using the very latest combustion modified ether (CME) and visco elastic foam technology. This high-quality product features a castellated foam surface, with a very specialist heel area.

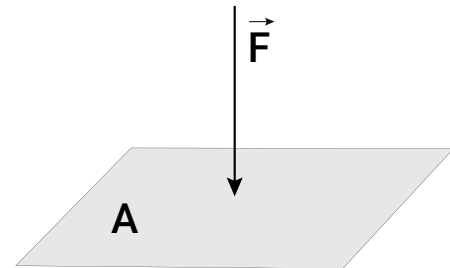
The pressure reducing castellated central zone maximises re-distribution in the most vulnerable areas, so that the mainstream patient weight can be managed effectively. The castellation's not only provide superior pressure management and postural support but it's channels are cut to ensure a constant air dispersion occurs around the patient. This process aids in controlling temperature when compared to standard mattresses and therefore endeavours to improve comfort and as such aids the patient's ability to sleep well. The ultra-soft heel section is sloped to reduce pressure, whilst an alternative cut (left to right) of visco elastic foam, provides maximum comfort levels. By gently tapering the heel area, pressure is redistributed effectively onto the less vulnerable calf area, thus providing outstanding results.

*NB: This wave heel design is also incorporated in another of Winnicare's mattress*





Pressure = Force / Area



By the very nature of its design – “Problematic Heel Pressures” are naturally displaced from the vulnerable heel areas to the calve muscles

Therefore, using the scientific methodology as above, the greater the surface area, the better displaced is the pressure (muscle/body mass over the calf region is a larger surface than that of a vulnerable heel area).



Pressure Mapping Image 1B (right) of Heel Area and Calve area, when using Argyll Hybrid™ and substantiating methodology above. Subject matter involved 80kg Male – skin exposed. Room temperature 22 degrees Celsius.



**“WAVE” DESIGN GRADIENT HEEL AREA (SPECIFICALLY NON-CASTELLATED)**

The design of the 12.5-degree tapered heel area is developed of such to remove direct heel pressure and displace on a wider surface area, (being the back of the calve). Naturally the equation Pressure=Force/Area heel achieves better re-distribution over a wider body surface area.

The wave cut, high density - visco foam works with any movement of the heel and indeed the multi stretch, vapour permeable cover. This unique design, reduces shear and friction forces and when coupled with the graded heel area has proven to be effective on very high-risk patient groups, who are otherwise susceptible to prospective heel damage.

The sloped design also allows the use of other pressure relieving devices as may be deemed necessary. However, it should be noted that this product has been used effectively on many patients with existing heel damage.



**Image 1AA (below)** Arrows provide a demonstration of actual shear and friction forces that naturally occur. The unique heel design (profile cut left to right, along with multi stretch, vapor permeable fabric, significantly reduces the “dragging impact” and as such relevant shear and friction forces. NB image shown is without a cover present for illustration purposes only).

The image shown represented a 3cm “drag force” reduction on this subject and represents an average of between 3 and 5cm drag distance when profiling a bed into the fowler position. See clinical reference below: \*\*\*Can pressure ulcers be prevented by using different support surfaces?



**Image 1AA (above)** – Representative image only – not part of this evaluation

## CLINICIAN’S OVERVIEW OF MANUFACTURER’S STATEMENT

There is nothing really to contraindicate what the manufacturer is suggesting within its literature. The images within, clearly demonstrate a very difficult scenario of attempting to measure shear forces in a simplistic manner.

The technical features of the pump, albeit much lower reported pressures are similar (in use) to many others on the market. The rapid ventilation of the cells, use of alternating cells up to the head section (for use on specific patient groups - occiput) and unusually effective heel area is considered unique and has been thoroughly effective throughout this evaluation.

The patient weight setting at the lowest level is particularly useful. It is unusual but demonstrably effective in that a 10mmgh setting would be available of true alternating or hybrid systems such as this (in the author’s experience). When used with frail and highly immobile patients (such as Mr H), whereby comfort and body mass size is of consideration, this proved to be a popular function with the carer’s, when prompted. Whilst initially the 52mmgh pressure exertion setting at the highest level was questioned. Upon further investigation, lots of dynamic systems are exposed to much higher cell pressures (MMGH – not to be confused with interface pressures). The patient used for the subject study was not of a larger body mass. However, he it was identified be comfortable throughout.

**IMAGE 1B**



**Image 1B** Grade IV healing pressure ulcer healed (some debriding 2 - weeks into trial). Notes: Avon 6 EH mattress was implemented and combined with modern wound care products and nutritional support, along with extensive TV input. TVN ensured mental health was addressed and antidepressants commenced. Pain is controlled.

**IMAGE 1D**



**Image 1D** Grade IV healing pressure ulcer healed (6 weeks into trial – various angles)

**IMAGE 1F**



**Image 1F** Grade IV Pressure Ulcer Healing (month 3 marked improvement on a severe wound)

**IMAGE 1C**



**Image 1C** Grade IV healing pressure ulcer healed (6 weeks into trial – various angles)

**IMAGE 1E**



**Image 1E** Grade IV healing pressure ulcer healed (6 weeks into trial – various angles)

**IMAGE 1G FINAL IMAGE**



**Image 1G** Grade IV healing (month 4) Notes: Wound has progressed extremely well, nutrition has improved and patient is now maintaining his weight. The patient's mood has improved vastly and now will interact with fellow residents. Mr S commented that he is "happy to speak to other residents as he doesn't feel embarrassed by "the smelly wound anymore". Finds the mattress very comfortable and sleeps well.

## CONCLUSION

Since implementing the Avon 6 EH mattress, his carers indicate that Mr S seems less agitated and sleeps better. Because of the sloping area on the mattress, due to none tolerance of dynamic systems, there have been significant improvements to what was a severe wound. In this case study, when this mattress design was combined with holistic nursing and nutritional care, the benefits have been clear to see.

The wave type cut of the “very light to the touch” visco elastic foam heel region, coupled with slight offloading is unique when together and have in the opinion of the author benefited reduced shear and friction for the patient.

These mattress design functions have evidently allowed the heels to be off-loaded, which has aided healing and has shown rapid improvement throughout this trial.

The Avon 6 EH is proving to be an extremely ingenious product design, which is easily applied in static mattress format. It has been proven to assist in even the most complex heel situations, whereby usually a dynamic mattress system may have been prescribed.

The tapered slope and use of foam is a very different product to that of various competitors / suppliers who have heel zones incorporated into the castellated foam or air cells. Since using the product the author identifies that there has been no opportunity to use heel devices, due to none acceptance. This design overcame that challenge.

Since the use of this product evaluation, the aim is to incorporate the Avon 6EH mattress as a first line static mattress throughout the authors professional organisation.

## RELEVANT COSTS & APPROPRIATE CLINICAL REFERENCES

It has been estimated that the cost is between s£363,000 / £543,000 to treat a Grade 3 pressure ulcer and that of £447,000 - £668,000 to treat a grade 4 pressure ulcer. Estimated treatment cost of chronic wounds in the UK is \*£2.3bn - £3.1bn. This Figure equates to an estimated 3% of the total NHS Expenditure (Department of Health 2010).

Nearly 700,000 people are affected by pressure ulcers each year across all care settings, including patients in their own homes with the most vulnerable patient over 75. Around 186,617 develop a pressure ulcer in hospital each year and each pressure ulcer adds up to over £4000 additional costs. (Ref: Hope 2014).

*\*\*\*Can pressure ulcers be prevented by using different support surfaces?*

Pressure ulcers (also called bed sores, pressure sores and pressure injuries are ulcers on the skin caused by pressure or rubbing at the weight-bearing, bony points of immobilised people (such as hips, heels and elbows). Different support surfaces (e.g. beds, mattresses, mattress overlays and cushions) aim to relieve pressure, and are used to cushion vulnerable parts of the body and distribute the surface pressure more evenly. The review found that people lying on ordinary foam mattresses are more likely to get pressure ulcers than those lying on a higher-specification foam mattress. In addition, the review also found that people who used sheepskin overlays on their mattress developed fewer pressure ulcers. While alternating-pressure mattresses may be more cost effective than alternating-pressure overlays, the evidence base regarding the merits of higher-specification constant low-pressure and alternating-pressure support surfaces for preventing pressure ulcers is unclear. Rigorous research comparing different support surfaces is needed: 3 September 2015 : Authors - McInnes E, Jammali-Blasi A, Bell-Syer SEM, Dumville JC, Middleton V, Cullum N.

N.I.C.E: Pressure ulcers: prevention and management - Clinical guideline (CG179) Published date: April 2014.

Excerpt: “Adults considered to be at high risk of developing a pressure ulcer will usually have multiple risk factors (for example, significantly limited mobility, nutritional deficiency, inability to reposition themselves, significant cognitive impairment[3]) identified during risk assessment with or without a validated risk assessment tool. Adults with a history of pressure ulcers or a current pressure ulcer are also considered to be at high risk”.

A guide to the treatment of pressure ulcers from grade 1–grade 4. Wound Essentials 2007; 2: 106-13 – Author: Wicks.

Public domain - Costs and Shaming Ref (archive:

<http://www.telegraph.co.uk/health/healthnews/8613764/Hospitals-namedand-shamed-on-bedsoures-record-whichcosts-NHS-4bn-a-year.html> (accessed 10 October 2011. Ref: Daily Telegraph print 4th July 2011: Hospitals ‘name and shamed’ on bedsoures record which costs NHS £4bn a year.

Notes:

In the interests of transparency, it should be noted that the Winnicare mattresses used within this evaluation were provided on a zero-cost basis to the establishments using them, post-evaluation.

No payment was exchanged to the involving parties, and full patient consent was obtained prior to the publication.

Clinical/Author Disclaimer: Please note that other products are available on the market, albeit not of this specific design.