What is the ThermoSpot…..?
It is a non-invasive hypothermia indicator for newborns, infants and children.

Why is such a device needed…..?
Throughout the disadvantaged world (3rd world/disadvantaged countries) some FOUR MILLION newborns die each year within their first 28 days of life through disease and malnutrition. A consequence of these two facts is that hypothermia can occur and there is no low cost, simple temperature indicator available for illiterate mothers to understand and use to identify this problem.

How long has this situation existed…..?
This problem, originally known as “Cold Injury” was first reported by Mann (1955) and Mann and Elliott (1957) and Bower et al (1960), is now well recognised by doctors looking after small children in temperate climates. It was also reported by Morley (1960) in older children.

References:

Surely there is a device to identify hypothermia…..?
Yes, but only a subnormal version of the conventional glass and mercury clinical thermometer which is not readily available throughout the disadvantaged world where it can prove difficult to use in high ambient temperature conditions. It is also expensive to buy and can only be used by an educated and specially trained person such as a nurse.

Is the ThermoSpot Indicator the first ever attempt to resolve this situation…?
Yes, nothing like it has ever been produced before, it is “a first”.

What does it look like and how does it work….?
ThermoSpot is a 12mm diameter black disc with two small white ‘dots’ on one side, the other side has a self-adhesive facility, it comes in a strip of five ThermoSpots. Liquid crystal technology provides the function for it to perform reliably and accurately within an operating tolerance of ± 0.5˚ Celsius. When in situ on a healthy newborn, infant or child, it will quickly change colour from ‘black’ to a ‘bright green’ background with a ‘smiling face’ clearly visible. This occurs between the temperatures of 36.5˚ and 37.5˚C which is the ‘safe zone’ for the average ‘normal’ temperature of a healthy newborn. Should however the temperature of a newborn begin to drop below 36.5˚C the ‘bright green’ background colour will begin to fade to a ‘pale green’ before a ‘terracotta’ colour appears as the temperature continues to drop, at 35.5˚C the original ‘black’ disc will feature. The illustration provided will show the widely accepted levels of hypothermia.

<table>
<thead>
<tr>
<th>Temperature (˚C)</th>
<th>Condition</th>
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<tbody>
<tr>
<td>39.0-37.5</td>
<td>Fever developing</td>
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<tr>
<td>36.5-35.5</td>
<td>Normal range</td>
</tr>
<tr>
<td>35.5</td>
<td>Cold stress</td>
</tr>
<tr>
<td>32.0</td>
<td>Moderate Hypothermia</td>
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<tr>
<td></td>
<td>Severe Hypothermia</td>
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- 39.0-37.5: Observe baby frequently
- 36.5-35.5: Safe zone
- 35.5: Cause for concern
- 32.0: Danger, warm baby!
- Outlook grave, skilled care urgently needed!
Where is the ThermoSpot positioned…..?
There are three recognised sites on newborns, infants and children to position this device, as follows;

An axilla, (deep into an armpit).
The hypochondrium, (above the liver).
The supraclavicular fossa, (on the great vessels of the neck).

Providing the site is carefully and gently wiped clean beforehand using an alcohol wipe, there is no reason why ThermoSpot should not stay in situ for up to 10 days.

It is worth drawing attention to the supraclavicular fossa, which is a quite new site for taking a reliable temperature using this device; this was first identified by an Indian Professor in Bangalore, India, Dr Ranjan Pejaver.

Instructions for use...(Provided with every pack containing a strip of 5 units of ThermoSpots.)

In the first 20 minutes of life, the temperature of a newborn may drop by as much as 2-4°C with even greater falls subsequently if proper care is not provided. Mothers may be unaware of the importance in keeping their baby warm within the ‘safe zone’ of 36.5˚ to 37.5˚C. ThermoSpot is a simple, non-invasive and inexpensive liquid crystal indicator, which at a glance, will identify whether a newborn’s body temperature is in the state of hypothermia, ie, at or below 35.5˚ C. ThermoSpot has an accuracy tolerance of ±0.5˚ C.

1. Instruct the mother on the importance of maintaining her baby’s body temperature within the ‘safe zone’ (36.5˚ to 37.5˚ C).
2. Place ThermoSpot in the axilla (under the arm) or on the right side of the upper abdomen, or on the great vessels of the neck. It is advisable to clean the site beforehand with an alcohol wipe.
3. Remove a ThermoSpot ‘disc’ from the backing strip and press firmly into the selected site, white ‘dots’ upright.
4. Provided the newborn’s body temperature is within the ‘safe zone’ a smiling face 😊 will appear on a bright green background. It is recommended that observations occur every two hours.
5. Mothers should seek advice if the ‘smiling face’ begins to fade or reverts to 😞.
6. ThermoSpot normally remains attached to the skin for at least a week, should the disc become dislodged a fresh ‘Spot’ is recommended.

To quickly demonstrate the ThermoSpot and see just how sensitive it reacts, place a ‘Spot’ on the outside of a glass or a discarded water bottle with the top half cut-off. Position the device about half way up and fill to this level with cold water, then carefully add a small amount of boiling water from a kettle. Continue adding slowly this very hot water until the black disc begins to change colour, stir the warm water to achieve a uniform temperature. When a bright green background to a ‘smiling face’ is clearly visible, a temperature of between 36.5˚ to 37.5˚ C will have been achieved. As the water cools so the background colours to the ‘smiling face’ will begin to fade.

Is the ThermoSpot re-usable…..?
Yes, even if the sticky back has failed from prior use. The ThermoSpot can be re-applied, using a recognised transparent medical tape such as Micropore. It is recommended that the device is washed in warm soapy water and dried before being re-attached.

For how long can the ThermoSpot be used…..?
For at least 12 months providing the device is carefully stored from sunlight, preferably in a cupboard, when not in use.

Who can use the ThermoSpot……?
Any Doctor, Midwife, Nurse, Traditional Birth Attendant (TBA), or Village Health Worker (VHW) but also an illiterate mother providing she receives instructions on its use and fully understands the significance of the background colours to the ‘smiling face’.

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From where can the ThermoSpot be purchased....?
The only distributor appointed is TALC (Teaching-aids At Low Cost) in St. Albans, UK.
E-mail: info@talcuk.org
Web page: www.talcuk.org
Address: PO Box 49, St. Albans. Herts. AL1 5TX. UK.

How is the ThermoSpot packed.....?
In self-seal polybags, 5 strips x 5 units (25 units) complete with Instructions for Use.

What is the cost for a pack x 25 units of the ThermoSpot from TALC.......
£3.50 per pack excluding postage & packing.
Bulk quantities available by special arrangement.

Are there any published papers on the ThermoSpot....?
Yes, see the References listed below.


What other studies have taken place using the ThermoSpot.....?
A two year Study entitled “Newborn Thermal Care Practices in Rural India: A Community-based Program to Prevent and Improve Recognition and Management of Hypothermia” ended in March 2005. The collaborating Institutions are:
* Chhatrapati Shahuji Maharaj Medical University (Upgraded King George Medical College), Lucknow, India.
* Grameen Vikas Sansthan, RaiBareli District, Uttar Predash, India.
* USAID-India, New Delhi Local Mission.
* Saving Newborn Lives Initiative (Save the Children Foundation), USA.

A hospital based Study using the ThermoSpot in the maternity unit at the Tribhuban University Teaching Hospital, Maharajgung, Kathmandu, Nepal.

The results of both studies are awaited at ‘any time’ now.

Are samples available for assessing the usefulness of the ThermoSpot....?
Yes, please contact Camborne Consultants.

What is the background to the ThermoSpot....?
In 1996, John Zeal of Camborne Consultants, was approached by Emeritus Professor David Morley, CBE, MD, FRCP of The Institute of Child Health, University of London. He was asked to design a thermometer for use in the ‘disadvantaged world’ to identify hypothermia in newborns, infants and children, where this condition continues to be the cause of high mortality rates during the first few weeks of life. His brief was to design and source a very simple, low cost temperature device capable of being understood by illiterate mothers.
In consultation with other experts in the field of clinical thermometry, he identified a need for a non-invasive hypothermia indicator for paediatric use. He approached a leading manufacturer involved in liquid crystal technology, Hallcrest Inc: USA, who, generously co-operated in providing several batches of prototype samples to his design out of which the *ThermoSpot* has emerged.

John Zeal recognises the invaluable assistance he has received in the conception of the *ThermoSpot* which has been developed as the result of much advice and discussion from the following:

- Emeritus Professor David Morley, CBE, MD, FRCP.
- Professor Colin Morley, MA, MD, DCH, FRCP.
- Professor George Grey, CBE, FRS.
- Dr Ivan Blumenthal, DCH, MRCP.
- Dr Michael Parsley, PhD.

John Zeal is a grandson of Giles Henry Zeal, who founded the family business of GHZeal Ltd in 1888. This Company has manufactured the conventional glass/mercury clinical thermometer, the universally accepted product for monitoring patient body temperatures, for well over a century. On leaving school at 17 years of age, he joined GHZeal Ltd and then spent the next five years acquiring the skills to make outright this fragile instrument, subsequently he was appointed the director responsible for production. The family business was sold in 1990 but by then he had begun to pioneer into UK hospitals the first ever ‘single-use’ clinical thermometer known as Tempa-DOT (3M Health Care).

This alternative clinical thermometer is now established as one of several new alternative devices to monitor patient body temperatures within both the NHS and Private sector hospitals.

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*John Zeal is a Liveryman of The Worshipful Company of Scientific Instrument Makers.*