

Measurement of the Thermal Resistance of Six Infant Mattresses

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Background

- **Sudden infant death syndrome (SIDS)** is a **leading cause of death** for infants aged one month to one year in developed countries.
- **Thermal stress** has been indentified as a significant **risk factor for SIDS** in many studies.
- **Heavy wrapping** and excessive **room heating** independently **increased the risk of SIDS**, especially in infants greater than 70 days.
- **Heat loss** in infants sleeping in the **prone** position is **60% less effective** than for infants lying in the **non-prone position** with the same clothing and bedding.
- **Avoiding overheating** infants is a well established recommendation to **decrease the risk of SIDS**.

Objective

To evaluate the thermal resistance of six infant mattresses: one standard and five that have been recently marketed to reduce risk factors for SIDS.

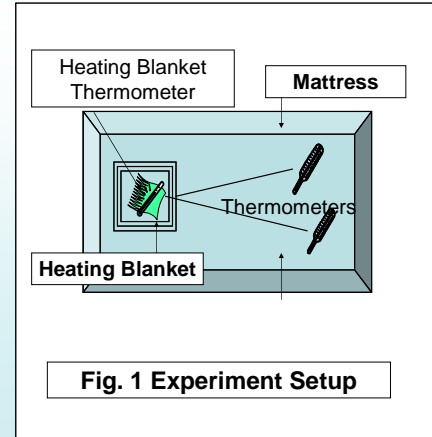
Methods

- An electric heating blanket with the approximate dimensions of a newborn (43x35x7 cm) and a fixed temperature of 31.4±0.3°C was placed on the mattress surface.
- Temperature was measured between the mattress and the heating blanket for 65 minutes every 5 minutes using two digital thermometers.
- Temperature measurement was started immediately after reaching a stable temperature of the heating blanket (Fig. 1)
- A prior experiment showed that more than 90% of the rise in temperature was measured during the first 60 minutes.
- Room temperature was kept at approximately 26°C±2°C by using standard heating and cooling techniques as needed.

Mattresses

- A - Airnetress®** - Meshed polyester netting stretched over a frame with an open area of approximately 50%
- B - Aminach Air®** - Foamed polyurethane with a 5 m"m honeycombed polyester upper surface
- C - Aerosleep®** - 5 m"m polyester honeycombed surface placed on a standard foam mattress
- D - Airflow®** - "Egg carton" like polyurethane layer covered with three layered polyester material
- E - Baby Shilav 3000®** - Foamed polyurethane with a a three layered polyester coating.
- F - Pang®** - Standard infant foam mattress (foamed polyurethane) with a one layered polyester coating.

Methods (cont.)



Results

Time	A	B	C	D	E	F
0	28.2	28.2	28.2	28.2	28.2	28.2
5	28.95	28.77	29.26	29.13	28.57	28.9
10	34.1	42.8	41.01	42.45	41.97	42.2
15	35.4	45.62	44.35	45.37	45.45	45.4
20	35.87	47.22	45.94	47.9	47.45	47.7
25	35.97	47.97	46.95	48.72	48.52	48.6
30	36.02	48.5	47.58	49.22	49.42	49.3
35	35.77	48.75	48.17	49.6	50.05	49.8
40	35.72	49	48.7	49.95	50.37	50.2
45	35.7	49.27	48.95	50.25	50.8	50.5
50	35.75	49.35	49.27	50.55	51.02	50.8
55	35.75	49.42	49.46	50.77	51.35	51.1
60	35.77	49.55	49.67	51.07	51.6	51.3
65	35.75	49.62	49.96	51.15	51.75	51.5

Table 1 Temperature Measurements: Between Mattress/Heating Blanket

Results (cont.)

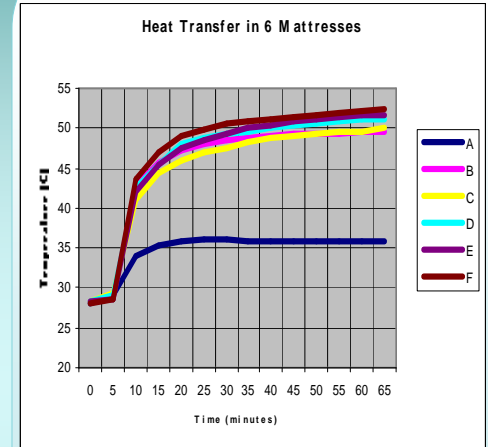


Fig. 2 Temperature Measurements: Between Mattresses/Heating Blanket

Conclusions

- **AirNetress®** sleep surface enables almost unrestricted heat transfer between both sides of the mattress in comparison with the other mattresses tested.
- **AirNetress®** most probably enables significant heat transfer via the face even when the infant's head is covered and is sleeping in the prone position.
- Use of **AirNetress®** may decrease overheating, an established risk factor for SIDS.