



NCCU CLINICAL GUIDELINES
SECTION: 4

THERMOREGULATION

Section 4: Thermoregulation
Incubators
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INCUBATORS

Infants born \leq 32 weeks gestation or 1500gms are to be placed into a humidified incubator as soon as possible following their admission (aim for less than 4 hrs from admission). It is recommended that these infants are administered their second dose of surfactant inside an incubator.

A skin temperature probe is to be attached to the infant nursed on 'air' mode to reduce the need for handling the infant frequently when temperature control is unstable. The skin probe may be viewed as a guide and enables the nurse caring for the infant to notice any fluctuations in temperature and be proactive in management to preventing cooling or overheating.

Infants should be observed through the portholes with the incubator sides kept closed to reduce fluctuations in air temperature and creating drafts.

BIRTHWEIGHT AND INCUBATOR TEMPERATURE RANGE

TABLE 1: NEUTRAL THERMAL ENVIRONMENT FOR INFANTS DAY 1 - 5				
Age	1000 - 1200g +/- 0.5 ⁰ C	1201 - 1500g +/- 0.5 ⁰ C	1501 - 2500g +/- 1.0 ⁰ C	>2500g and >36wk
0 – 12 Hours	35.0	34.0	33.3	32.8
12 - 24 Hours	34.5	33.8	32.8	32.4
24 - 96 Hours	34.5	33.5	32.3	32.0

TABLE 2: NEUTRAL THERMAL ENVIRONMENT FOR INFANTS > 5 DAYS OF AGE			
Age	<1500g	1501 - 2500g	>2500g and > 36 wk
5 - 14 Days	33.5	32.1	32.0
2 - 3 Weeks	33.1	31.7	30.0
3 - 4 Weeks	32.6	31.4	
4 – 5 Weeks	32.0	30.9	
5 - 6 Weeks	31.4	30.4	

Note: Within each range, the younger the infant and/or the lower the infant's weight, the higher the temperature required.

PROCEDURE

1. The humidity and temperature settings should be individually assessed for each infant according to weight, gestation and the temperature recordings during the admission process
2. Pre warm an incubator to 2 degrees above that required by the infant. Measure and document infant's PA temperature immediately prior to transferring to an incubator and recheck 30 min after transfer. Set the incubator to the required air temperature in air control mode.
3. If the infant is less than 32 weeks gestation and requiring humidity a temperature probe must be used to provide a guide to infant's temperature. Apply the temperature probe under the axilla and compare PA temp with temperature probe. Once accuracy of skin probe is confirmed, monitor continuously and record hourly. Differences of 0.5 degree are acceptable.
4. If the infant's axilla temperature rises above 37.2⁰C, reduce the air temperature 0.5⁰C every hour until the infant's temperature falls within the target range.
5. If the infant's temperature falls below 36⁵C, increase the incubator temperature by increments of 0.5⁰C every hour until the temperature is within the target range. Adjust humidity accordingly. Recheck within an hour of making any adjustments. The temperature probe will provide a guide during this time.
6. All infants in incubators should be dressed (including a hat), except:
 - Umbilical lines
 - Extreme levels of humidity
 - Poor skin condition
 - Phototherapy
7. Document PA temperature 4 hourly and incubator and temperature probe readings hourly.
8. Incubators must be cleaned daily and changed monthly or sooner if soiled

INCUBATOR HUMIDITY

It is recommended that infants' ≤ 27 weeks gestation be commenced in an incubator humidity of 80%. However this should be assessed according to skin integrity, gestational age, CGA and the set temperature requirement of the incubator.

Weaning of humidity should be alternated with weaning of the incubator temperature until a level is reached that maintains a PA temperature within the target range.

SUGGESTED VALUES FOR BALANCE OF HUMIDITY AND INCUBATOR TEMPERATURE	
Incubator temperature	Humidity %
38	80
37	70
36	60
35	50
34	40

Weaning of humidity should be commenced during the first week of life when the infant is able to maintain a per axilla temperature within the target range. Weaning should commence at 5% intervals over the period of a week to around 50% at the end of the first week of life.

During the second week of life the humidity can be reduced to 40% and thereafter ceased if the incubator is at or less than 34 degrees. Some infants may require humidity for up to 3 weeks of age however this should be discussed with a senior nurse.

Incubator humidity is provided by acetic acid or sterile water; this will depend on the incubator used.

Acetic acid	Sterile water
Mainly used in the ATOM incubators. Empty and replace with new acetic acid every 7 days	Used in Omnibed. Empty water and replace with new sterile water every 24 hours.

INCUBATOR 'RAIN OUT'

Rain out should not occur. It usually means there is a mismatch between the humidity set and the incubator temperature. See table of suggested settings below to avoid rainout. A bubble plastic sheet over the top of the incubator will stop environmental issues that affect the top and walls of the incubator.

INCUBATOR USAGE FOR PHOTOTHERAPY OR ISOLATION

PHOTOTHERAPY:

1. Reduce the incubator temperature by 0.5⁰ when phototherapy commences.
2. Increase the incubator temperature by 0.5⁰C immediately on completion of phototherapy until the infant can be dressed /graded out of the incubator.
3. If the infant's temperature >37.2⁰ C reduce the incubator temperature by 0.5⁰C. Infant may need to be transferred into an open cot.
4. If overheating occurs with infants in an incubator due to isolation / observation, remove any clothes, turn setting down to minimum.
5. Do not leave portholes open.
6. Do not turn off incubator power.

ISOLATION:

1. Depending on the weight and age of the infant the incubator should be set at the appropriate temperature to maintain the PA temperature within the target range.
2. Peripheral temperature probes may be used to reduce handling of the infant.

FURTHER READING

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