Supplementary file 1: Implemented Clinical Practice Guideline

[Health Department Logo]

GUIDELINE	
Fever Without Source - Inpatient Management and Discharge	
Scope (Staff):	Medical, Nursing
Scope (Area):	[Hospital] **Inpatient wards**

This document should be read in conjunction with this DISCLAIMER

Aim

To guide clinical staff in the management of well-appearing infants less than 3 months of age after admission to hospital for the management of fever without source.

Guidelines for the initial assessment, investigation and management of infants presenting to the **Emergency Department** with fever without source can be accessed at [website URL]:

Definitions

Fever without source (FWS): A child or infant presenting with a fever > 38°C (axillary or rectal) without a readily identifiable source on history and/or physical examination (e.g. no coryzal or other respiratory signs/symptoms).[1]

Risks

Prolonged admission, over-investigation and over-treatment of infants at low-risk of serious bacterial infections (SBI) increases the risks of adverse events and iatrogenic complications,[2,3] and promotes the emergence of antibiotic resistance.

Unnecessary hospitalisation can result in significant emotional burden and financial costs for families and the health care system.[4]

Key Points

- Fever without source (FWS) is one of the most common reasons young infants less than 3 months old present to hospital.
- Most infants will have a self-limiting viral infection (~90%).[2,5] however serious bacterial infections (SBI), such as urinary tract infection, bacteraemia or meningitis, which require intravenous antibiotics, must be excluded by investigations including blood, urine and cerebrospinal fluid cultures.
- Previously, <u>all</u> infants remained in hospital until blood cultures were confirmed negative after 48 hours of incubation, regardless of clinical status.
- Recent evidence suggests that most well-appearing infants at low risk of SBI can safely be discharged home earlier (after 24 – 36 hours).[2] This change in clinical practice has been supported by the use of continuous monitoring blood culture systems to detect positive blood cultures in real-time[4,6] and the use of risk stratification criteria to identify infants at low risk of SBIs.[5,7-10]

- The safety of earlier discharge for appropriately selected infants with FWS has been demonstrated[11,12] and subsequently introduced into clinical practice in other Australian tertiary paediatric institutions.[13,14]

Target group

All infants aged less than 3 months old (chronological or corrected for prematurity for infants born before 37 weeks gestation) admitted to hospital for investigation and management of fever without source.

Management

1. Initial management of all febrile infants:

On presentation and admission to hospital, all infants admitted undergo investigation and initiation of antimicrobials for FWS as directed by their treating team. This includes:

- Baseline blood tests: full blood picture (FBC), C-reactive protein (CRP), +/- renal and liver function tests
- Blood culture (BC)
- Urine microscopy and culture, obtained by in-out catheter or suprapubic catheter
- Lumbar puncture (LP) for cerebrospinal fluid (CSF) microscopy and culture for infants aged ≤28 days old or who appear unwell/toxic, unless contraindicated.
    - LP should be considered in other infants as guided by their clinical appearance and the treating team.
        - Refer to the Emergency Department Guidelines for indications / contraindications and procedure for Lumbar Puncture.
    - Herpes simplex virus (HSV) PCR should be performed if risk factors for HSV infection identified.
- Other investigations may include (as guided by clinical condition and the treating team):
    - Viral studies obtained by flocked swab and/or throat/rectal swabs, +/- viral/bacterial PCR on CSF
    - Chest X-ray
    - Stool sample for microscopy and culture
- Please refer to Emergency Department Guidelines for Fever Without Source for further information regarding the initial assessment and management of FWS, and the hospital antimicrobial guidelines.

2. Risk Stratification

High risk infants.

- The following infants are considered at high risk of SBI:
    - Infants who appear unwell or toxic on presentation.

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- Infants aged ≤ 28 days (chronological or corrected for prematurity for infants born before 37 weeks gestation), regardless of clinical signs.
- Infants with a history of significant comorbidity e.g. congenital cyanotic heart disease, chronic lung disease (oxygen-dependent), significant neurological comorbidity, surgery within previous 4 weeks and prosthesis in situ, e.g. ventriculoperitoneal (VP) shunt or central venous access device (CVAD).

- High risk infants should receive a minimum of 48 hours admission and intravenous antimicrobials as directed by their clinical status and investigation results.

Table 1: Features suggestive of an unwell child:

General aspects of the child's behaviour and appearance will inform the clinician's assessment of whether the infant is considered "well" or "unwell / toxic". Signs and symptoms of an unwell child may include but are not limited to:
A. Appearance: 1. Poor tone/floppiness 2. Marked lethargy or decreased activity 3. Inconsolable or irritability 4. Altered mental status including increased sleepiness 5. Weak, high-pitched or continuous cry, 6. Limited interaction (not responding to normal social cues) 7. Seizures or abnormal posturing *8.* Petechial or purpuric rash
B. Breathing: 1. Signs of increased work of breathing: grunting, nasal flaring, stridor, wheeze, increased respiratory rate 2. Hypoxia
C. Circulation and hydration: 1. Pallor, mottling, or cyanosis 2. Persistent tachycardia (>180 bpm) 3. Reduced urine output (<4 wet nappies in 24 hours), history of poor feeding (<50% normal) 4. Dry mucous membranes, reduced skin turgor, increased capillary refill time (>3 seconds) ***In addition, parental concern regarding their infant should not be underestimated.***

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Low / Standard risk infants

Infants not considered "high risk" should be assessed against the following **risk stratification criteria** to determine further management.

- **Low Risk**: Infants are considered low risk if they fulfil ALL of following 5 criteria:
    1. Absence of pyuria (< 10 white cells per high powered field), *and*
    2. CRP < 20 mg/L, *and*
    3. Absolute neutrophil count (ANC) < 10 x 10^9/L and white cell count (WCC) between 4 x 10^9/L and 15 x 10^9/L.
    4. Has not received antibiotics within 48 hours prior to admission
    5. No features of the "unwell" child
- **Standard Risk:** Infants are considered and managed as per standard risk if they do no fulfil all of the above criteria.

3. Early Discharge Criteria

Low risk

- All low risk infants are eligible for discharge after **24 hours** of admission if:
    - They remain well-appearing,

      And
    - All bacterial culture results (blood, urine and CSF microscopy (if applicable)) are negative at **24 hours (**please refer to 4.a. in "Practice Points to consider" regarding timing for blood culture result reporting**)**.

All other infants

- High-risk infants, standard-risk infants and low-risk infants not fulfilling the "early discharge criteria", e.g. unwell appearing or with a positive bacterial culture, should remain in hospital for a minimum of 48 hours and receive care as directed by clinical status and investigation results.

4. Practice Points to consider:

- Positive blood cultures are communicated via telephone by the microbiologist to the treating medical team as soon as possible after flagging positive and are available electronically after performance of the Gram stain.
    - Not all laboratories will have capacity to communicate these results outside of laboratory hours (8pm – 8am). Discharge of infants should therefore not occur overnight unless "no growth at 24 hours" has been communicated directly by microbiology staff or formally reported electronically.
- Herpes simplex virus (HSV) is a significant viral infection requiring antimicrobial therapy. An infant testing positive for HSV is not considered low or standard risk.

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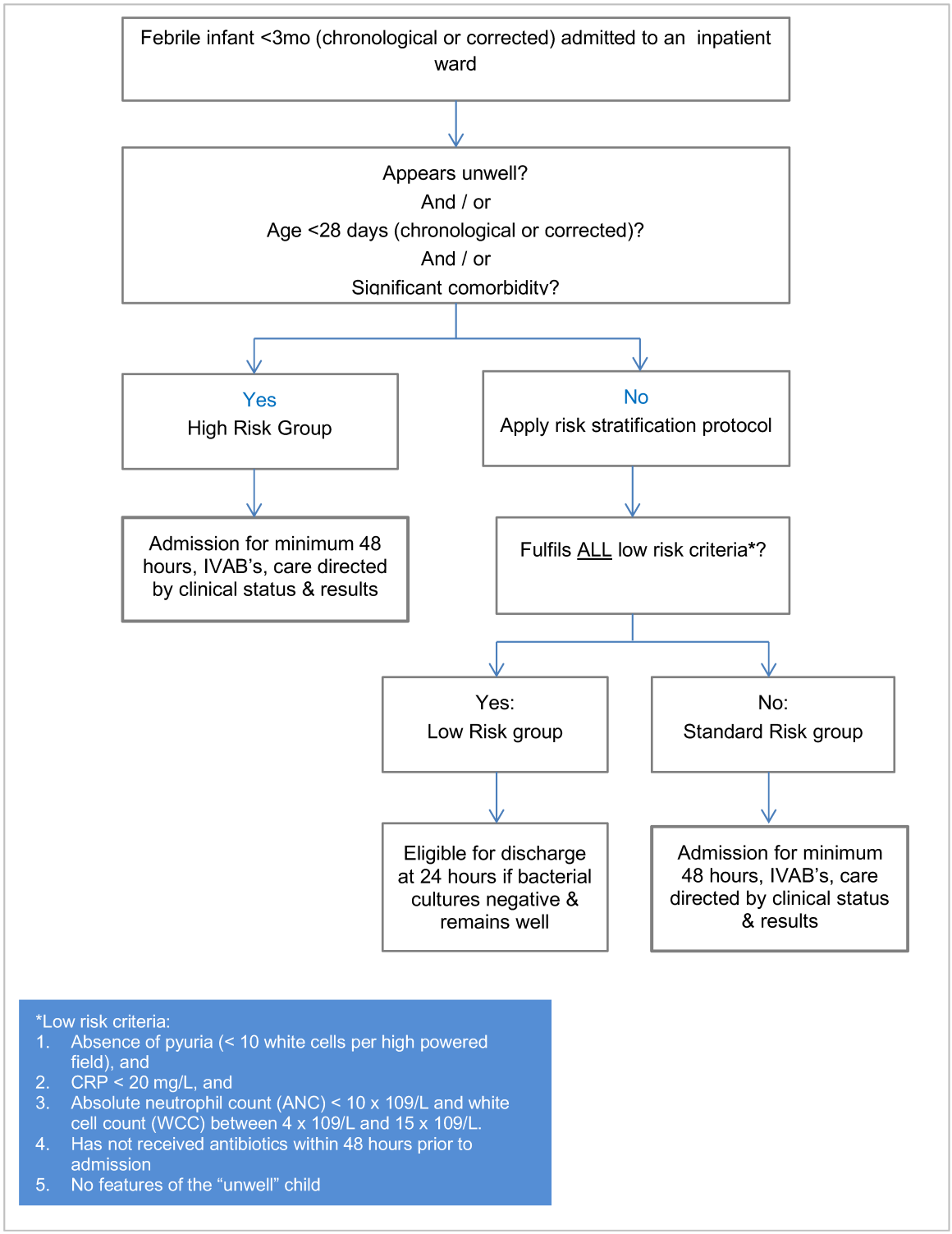
- If the significance of a viral pathogen result is uncertain, please discuss with the treating team and / or Infectious Diseases / Microbiology for further management guidance.
- Discharge planning should always take into consideration family and social factors, such as geographical location and access to follow-up or transport. The above provides a guide to discharge planning, however select low or standard risk infants may require longer admissions than indicated above as directed by individual circumstances.

Discharge advice and Follow-up

- All caregivers should receive written and verbal information regarding indications to return to hospital/primary physician for medical review.
- The treating team should contact caregivers within 24 hours of discharge to review patient progress and to relay the final confirmed microbiology results (e.g. blood culture negative at 48 hours).
- Blood culture results for all infants discharged prior to 48 hours (regardless of risk group status) must be be reviewed by the treating team after 48 hours completed incubation to identify any late positive results.
- It is recommended that late positive blood cultures results are discussed with the senior clinician of the responsible medical team to determine appropriate follow-up.
- Refer to the Flowchart below to assist in discharge decision-making for infants < 3 months old admitted to hospital with fever without source

Fever Without Source (Inpatients)

Flowchart: Discharge decision-making for infants < 3 months old admitted to hospital with fever without source



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