Febrile Non Septic Paediatric Oncology Patient Management at John Hunter Children's Hospital

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Aim Statement: : By December 2020, the average LOS of febrile non septic paediatric oncology patients within JHCH will be reduced by 20%

The admission for fever is the most common unplanned hospitalisation in children being treated for cancer. Many studies have tried to predict those who can be discharged earlier from hospital with some success. If we can safely reduce their length of stay it will have cost savings but also implications for families as it will lead to more time out of hospital during a very stressful time in the family's life.

Team members

- **Sponsor**
- **Dr Paul Craven**

- **Project Team**

Dr Frank Alvaro
Research Nurse - Jaime Chase
Paed Oncology Fellow - Dr Josh Serov
Paediatric Oncology Pharmacist – Kristie Day
Paediatric Oncology CNC – Carol Doherty
Paediatric Oncology CNE – Emma Zietsch
NUM – Sandra Stone
Paediatric Oncologists

NSQHS Standard 5 – Comprehensive Care

NSQHS Standard 8 – Recognising and Responding to Acute Deterioration

Literature review

Guideline for the management of fever and neutropenia in children with cancer and/or undergoing hematopoietic stem-cell transplantation Thomas Lehrnbecher 1, Robert Phillips, Sarah Alexander, Frank Alvaro, Fabianne Carlesse, Brian Fisher, Hana Hakim, Maria Santolaya, Elio Castagnola, Bonnie L Davis, L Lee Dupuis, Faith Gibson, Andreas H Groll, Aditya Gaur, Ajay Gupta, Rejin Kebudi, Sérgio Petrilli, William J Steinbach, Milena Villarroel, Theoklis Zaoutis, Lillian Sung, International Pediatric Fever and Neutropenia Guideline Panel

Morgan J, Cleminson J, Atkin K, et al. Systematic review of reduced therapy regimens for children with low risk febrile neutropenia. Support Care Cancer. 2016; 24:2651-2660

Orme L, Babl F, Barnes C, et al. Outpatient versus Inpatient IV antibiotic Management for Pediatric Oncology Patients With Low Risk Febrile Neutropenia: A Randomised Trial. Pediatr Blood Cancer. 2014;61: 1427 -1433

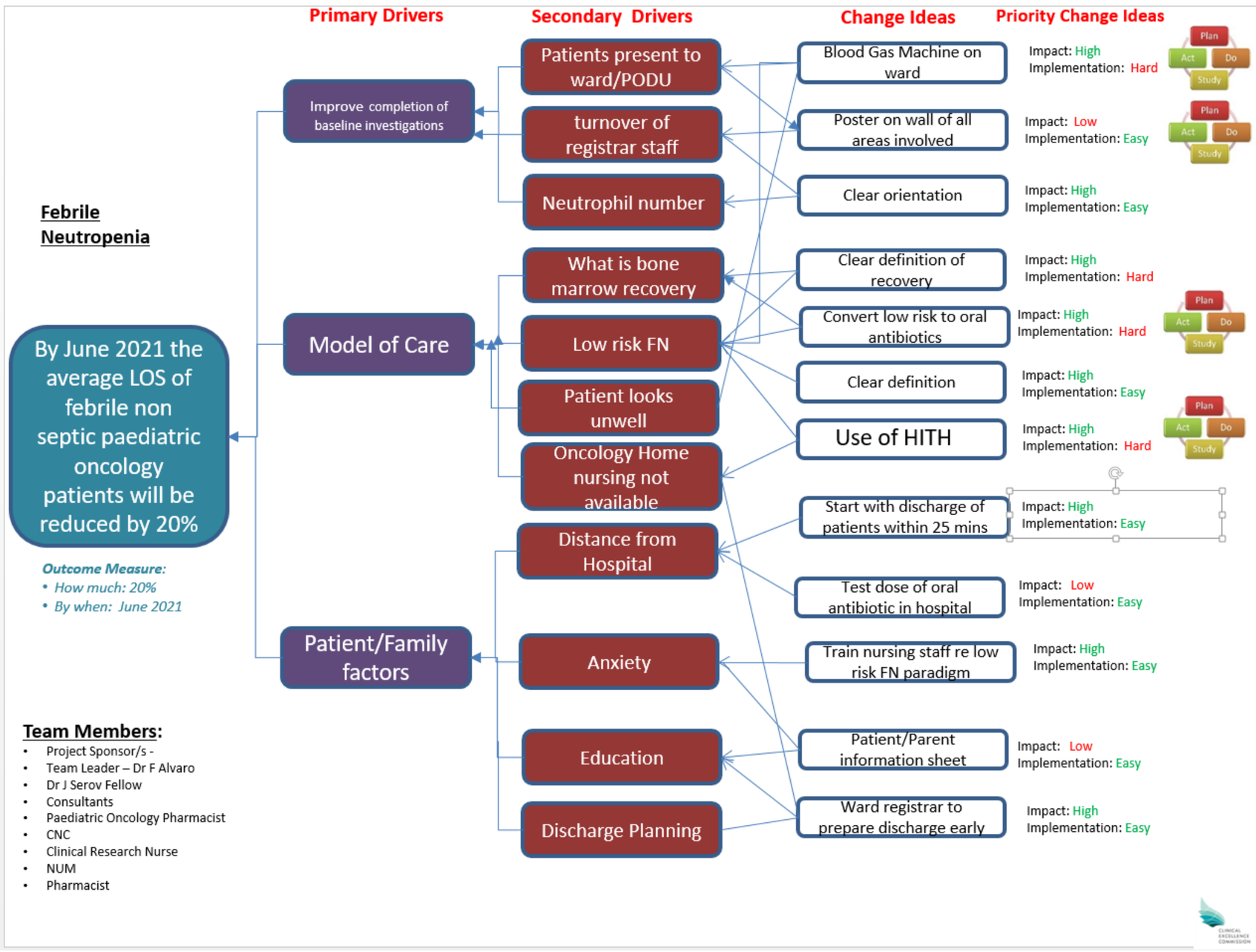
Tueffel O, Amir E, Alibhai et al. Cost-effectiveness of Outpatient Management for Febrile Neutropenia in Children with Cancer. Pediatrics. 2011;127, 2, 279-286

Haeusler GM , Thursky K, Slavin M, et al. External Validation of Six Pediatric Fever and Neutropenia Clinical Decision Rules. Pediat. Infectious Disease Journal;2018;37(4):329-335

Haeusler GM, Slavin MA, Bryant PA et al. Management of fever and neutropenia in children with cancer: A survey of Australian and New Zealand practice. J Paediatr Child Health. 2018 Jul;54(7):761-769

Haeusler GM, Thursky KA, Mechinaud F et al. Predicting Infectious ComplicatioNs in Children with Cancer: an external validation study. Br J Cancer. 2017. 11;117(2):171-178

Risk stratification in children with cancer and febrile neutropenia: A national, prospective, multicentre validation of nine clinical decision rules
Gabrielle M Haeusler 1 2 3 4 5, Karin A Thursky 1 2 3 5 6 7 8, Monica A Slavin 1 2 3 5 8, Franz E Babl 9 10 11 12, Richard De Abreu Lourenco 13, Zoe Allaway 1 2 14, Francoise Mechinaud 14 15, Robert Phillips 16 17, Australian PICNICC study group and the PREDICT network



Rules to determine safety and appropriateness of care. This will decrease variance amongst consultant staff

AUS-rule Variables	Yes	No
Preceding chemotherapy more intensive than ALL maintenance	1	0
Total white cell count < 0.3 x10^9/L	1	0
Platelet <50 x10^9/L	1	0
TOTAL SCORE		
Score 0 = This patient is **very-low risk** for a bacterial infection. If they are clinically stable (In between the FLAGS) and fulfil the HITH safety-net criteria then transfer to the 'Low-risk FN program' after a **minimum of** 12 **hs of observation.**		
Score 1 = This patient is **low risk** for a bacterial infection. If they are clinically stable (In between the FLAGS) and fulfil the HITH safety-net criteria then transfer to the 'Low-risk FN program' **within 24 hs.**		
Score 2 = This patient is **moderate risk** for a bacterial infection. If they are clinically stable (In between the FLAGS) and fulfil the HITH safety-net criteria then *consider* transfer to the low-risk FN program after a **minimum of 24 hs inpatient observation**.		
Score 3 = This patient is **higher risk** for a bacterial infection. If they are clinically stable (In between the FLAGS) and fulfil the HITH safety-net criteria then ***consider*** transfer to the low-risk FN program after a **minimum of 36-48 hrs inpatient observation**.		

Results

Information from previous 12 months was gathered in Jan 2020

Initial meeting with project group was undertaken in April 2020. Unfortunately COVID-19 caused significant disruption to the project and it was placed on hold.

Mid this year, an Australian initiative was funded through the MRFF, 'No place like Home' researching the economic and psychosocial advantage of receiving care at home in those discharged with low risk febrile neutropenia.
This provided a catalyst to combine the research with this project to standardise our therapy and provide care at home

We have audited our data and compared them with the recent published Australian data. Our data is comparable. We admit all patients with a significant number who would be deemed low risk and potentially able to continue with therapy at home.

The plan is to pilot a standardised approach in November 2020, after processes are created to change the model of care safely.
Evaluation of pilot will be undertaken in February 2021
Full implementation complete in March 2021 unless issues have arisen during pilot, that require changes to the Model of Care.

Discussion

Febrile Neutropenia is the commonest non planned reason for hospitalisation in this cohort of patients.

We needed to be sure that the initial assessment was appropriate on each occasion of presentation. A number of steps needed improvement, and the change ideas created areas of focus. The easiest to implement was the initial assessment and appropriate investigations.

Once the initial presentation management was appropriate, the next step was to determine whether early discharge was feasible and appropriate. Research suggests that this can be safely done in a proportion of children admitted with FN after a period of observation. Our working group determined the level of safety required for 3 separate groups prior to discharge to the HITH service.

Once the pilot commences, evaluation will occur on a continual basis to determine whether the pilot is successful.

Specifically, readmissions to hospital related to fever and positive blood cultures in those that are discharged to HITH will be monitored

This project has the possibility to decrease LOS more substantially than the original aim of 20%, to improve patient and family well being and potentially have significant cost savings.

Criteria for appropriate transfer to HITH, to continue therapy at home, but is safe for patient care.

Criteria	Eligible	Not eligible
Disease status. Leukaemia/lymphoma in remission (as per last BMA) or solid tumour stable/responding (as per oncologist)	Yes	No
Disease group. Not any of: ALL induction, infant ALL, AML, post HSCT, congenital immunodeficiency, aplastic anaemia	Yes	No
Expected duration of neutropenia < 7 days	Yes	No
No confirmed focus of infection requiring inpatient care*	Yes	No
No medical complication requiring inpatient care**	Yes	No
No severe sepsis at FN presentation***	Yes	No
No active infection with multi-drug resistant bacteria (ie, MRSA, VRE, MDRGN)	Yes	No
Availability of a 24 hour caregiver	Yes	No
Good education of patient and carer on reportable symptoms	Yes	No
Availability of a telephone (with credit)	Yes	No
Availability of 24 hour phone advice/emergency department review from treating hospital	Yes	No
Within 20 minutes of treating hospital	Yes	No
Treating team preference	Yes	No
No previous history of non-compliance with medical care	Yes	No

*including, *but not limited to*, CVAD site infection, cellulitis, perianal cellulitis or pain, pneumonia, colitis.

**including, *but not limited to*, pain requiring intravenous analgesia, poor oral intake or excessive loss requiring intravenous hydration; respiratory distress or oxygen requirement; pulmonary infiltrates on CXR.

***severe sepsis includes any of (i) altered conscious state, (ii) inotrope requirement, (iii) fluid bolus requirement >40ml/kg or (iv) respiratory report requirement

Plans to sustain change

PPG currently in draft phase will be complete

No place like home research project will continue to collect data from us and other Australian sites over the next 2 years
Local audit will continue to be performed to determine whether the distance from hospital will be stretched

Plans to spread /share change

Once JHCH program is embedded and successful, consideration whether it can be transferred to regional referral hospitals

'No place like home' will be published in a suitable journal.