

Acute Lymphoblastic Leukaemia PI-ALL 1 Protocol

POSG Pacific Island Workstream Clinical Members

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TREATMENT OUTLINE

Prephase (phase 0, 1 week)

IT MTX, Prednisone.

Induction (phase 1, 5 weeks)

IT MTX, Prednisone, Vincristine, L-Asparaginase

CNS prophylaxis/Consolidation (phase 2, 6 weeks)

IT MTX, Vincristine, Cyclophosphamide, ARA-C

Continuous Maintenance (phase 3, 96 weeks)

IT MTX, Vincristine, Dexamethasone, 6-Mercaptopurine, Methotrexate

1. IT MTX for first year of therapy only

Abbreviations:

VCR = vincristine; PDN = prednisone; L-asp = L-asparaginase;
Cyclo = cyclophosphamide; Ara-C = cytarabine; MTX = methotrexate;
ITMTX = intrathecal methotrexate; 6MP = 6-mercaptopurine;
DEX = dexamethasone;

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1.0 AIMS

Primary

- 1.1** To increase the proportion of children with acute lymphoblastic leukaemia (ALL) who are cured.

Secondary

- 1.2** To assess the ability of Pacific Island health systems to deliver chemotherapy according to an adapted protocol.
- 1.3** To assess the ability of Pacific Island health systems to provide supportive care guided by protocol and shared care consultation from NZ centres.

2.0 RATIONALE FOR STUDY DESIGN

Children and young people in the Pacific have not enjoyed the survival of their peers in developed health systems. This has been the result of a number of factors including late or non diagnosis, treatment toxicity on protocols considered standard in developed health systems and treatment abandonment due to expense and family dislocation. This protocol has been drawn from strategies used by NZ and Australian paediatricians to treat children with ALL in the past, at a time when the ability to treat and support children with malignant disease was at an early stage of development.

The protocol should be able to be delivered in its entirety in Fiji. Eligible patients in Samoa and Tonga will receive prephase in their base hospital and good responders will be referred to NZ for Induction and CNS prophylaxis/consolidation. All patients will be repatriated for on going maintenance therapy (or palliative care if not achieving remission)

3.0 PATIENT ELIGIBILITY

- 3.1** Newly diagnosed children with ALL aged between 1 and 18 years of age (inclusive) without B-cell ALL (FAB L3) are eligible.
- 3.2** Patients with Down syndrome.
- 3.3** Patients who have blast counts $>1 \times 10^9/L$ in peripheral blood after the 7 day prednisone (and ITMTX) prophase come off protocol and receive symptomatic care.
- 3.4** Patients who are not in remission on the Day 35 BMA come off protocol and receive symptomatic care.

4.0 EXCLUSIONS

- 4.1** Patients with B-cell ALL [FAB L3]
- 4.2** Patients aged ≤ 1 year or ≥ 18 years at diagnosis
- 4.3** Patients with WBC $>200 \times 10^9/L$ are not eligible
- 4.4** Patients with CNS disease (CNS blasts $> 5 \times 10^6/L$) are not eligible

5.0 INITIAL EVALUATION

- 5.1 Complete history including family history
- 5.2 Complete physical examination including careful documentation of size of lymph nodes, spleen and liver size, presence of extra-medullary involvement
Measure height and weight and calculate surface area
- 5.3 Chest X-ray
- 5.4 Full blood and platelet count
- 5.5 Bone marrow aspirate (BMA)/trepine
 - 5.51 For morphology and cytochemistry
- 5.6 CSF examination
 - 5.61 For cell count
 - 5.62 For cytopspin
- 5.7 Biochemistry
(liverfunction/urea,electrolytes,creatinine,urate,calcium,phosphate), cultures, mantoux, virology (Hepatitis B) etc according to clinical circumstances and individual institution's requirements. Note a negative mantoux does not exclude Tb

6.0 REGISTRATION

- 6.1 Upon diagnosis all patients with ALL will be recorded on the unit registry.

7.0 TREATMENT

All eligible patients receive identical therapy. CNS preventative therapy will vary according to age. Total length of therapy is 102 weeks (2 years) from documentation of remission (see 7.5).

- 7.1 Induction therapy should not commence until appropriate supportive care has been given. This includes correction of anaemia and thrombocytopenia, treatment of infection, appropriate hydration, allopurinol and correction of electrolyte disorders.
A suggested routine is - allopurinol 300 mg/m²/day in 3 divided doses - Hydration at 3000mL/m²/day (125mL/m²/hour) with 4% Dextrose and 1/5 N Saline, initially potassium free. Individual institutions may have different concentrations dextrose saline (3.5% dextrose/1/3 N saline)
- 7.2 For patients in Samoa and Tonga, initiate proceedings for referral to NZ at day 8 should the patient be a good responder to prednisone prephase.

7.3 PREPHASE- 1 WEEK

All eligible patients will begin prednisone prephase after confirmation of diagnosis on bone marrow aspiration and following lumbar puncture and administration of age appropriate dose of intrathecal methotrexate.

- 7.31 **Prednisone 40 mg/m² orally in 2 divided doses Days – 7 to 22 then taper**
 - 7.311 Hyperglycaemia - no modification will be made and insulin therapy will be used (see 7.421)
 - 7.312 Hypertension - reduce dose by 50% and consider sodium restriction and anti-hypertensives
 - 7.313 Pancreatitis - if severe, cease

7.32 Intrathecal methotrexate

7.321 Methotrexate will be administered according to an age-related formula:

Age	1-2 years	2-3 years	>3 years
Dose	8mg	10mg	12mg

Perform lumbar puncture and if CSF flowing freely collect 4-5 mls and send CSF for cytospin and a smaller volume for culture.

If CSF blood stained this makes analysis difficult due to blood contamination. May need to resite needle.

Inject IT methotrexate as a slow push. There should be no resistance.

Peripheral blood count on day 8 determines ongoing treatment. Patients with differential lymphoblast counts less than $1 \times 10^9/L$ are regarded as good responders and will go on to induction therapy. Patients who have persisting elevations in peripheral blood blast counts are regarded as unfavourable prognosis patients who are unlikely to be cured without intensive therapy which this protocol does not offer.

In Fiji, good responders will proceed to induction. In Samoa and Tonga, good responders will be sent to New Zealand.

7.4 INDUCTION THERAPY - 5 WEEKS

During induction therapy no dose will be delayed solely because of myelosuppression.

7.41 Vincristine $1.5\text{mg}/\text{m}^2$ (maximum dose 2mg) IV push on Days 1, 8, 15 and 22.

7.411 Seizures secondary to vincristine - withhold one dose then reinstitute (on anticonvulsant therapy).

7.412 Severe foot drop, paralytic ileus - withhold dose and resume at $1.0\text{mg}/\text{m}^2$. When symptoms abate, escalate to full dose as tolerated.

7.413 Jaw pain - treat with analgesics and do not modify vincristine dose.

7.414 Defer if abnormal liver function is present (AST $>3 \times$ upper limit of normal or bilirubin $>25\ \mu\text{mol}/L$). Resume when liver function is returning to normal.

7.42 Prednisone $40\text{mg}/\text{m}^2/\text{day}$ orally in 2 divided doses on days 1-21 and then tapered over 7 days as per the following:-

$20\text{mg}/\text{m}^2/\text{day}$ for 2 days, $10\text{mg}/\text{m}^2/\text{day}$ for 2 days, $5\text{mg}/\text{m}^2/\text{day}$ for 2 days, $2.5\text{mg}/\text{m}^2/\text{day}$ for one day.

7.421 Hyperglycaemia - no modification will be made and insulin therapy will be used.

7.422 Hypertension - reduce dose by 50% and consider sodium restriction and anti-hypertensives.

7.423 Pancreatitis - if severe, cease.

7.43 E coli (LEUNASE) L-asparaginase $6000\text{U}/\text{m}^2$ IM x 9 doses on Monday, Wednesday, Friday starting on Day 2 or 3.

7.431 Hyperglycaemia - no modification will be made and insulin therapy will be used.

7.432 Pancreatitis - if symptomatic and hyperamylasaemia is present ($> 2.6 \times$ upper limit of normal), L-asparaginase should be ceased and not restarted.

- 7.433 Bleeding (not due to thrombocytopenia) or thrombosis - withhold L-asparaginase until resolved. Laboratory evidence alone of abnormal haemostasis without bleeding is not an indication to withhold L-asparaginase.
- 7.434 Allergy or anaphylaxis. If objective hypersensitivity to E. coli L-asparaginase occurs, international practice would be to substitute Erwinia asparaginase . However because of the extremely high cost of this product it is unlikely to be available for use by Pacific Island health systems. In this eventuality Asparaginase administration would cease with allergy to E coli Asparaginase (Leunase). Pain and non-allergic inflammation are not an indication to withhold L-asparaginase.
- 7.435 Stroke syndrome or cerebral thrombosis or haemorrhage are indications to cease L-asparaginase.
- 7.436 Individual institutions may wish to monitor clotting profiles during L-asparaginase therapy. However, abnormal results without clinical manifestations are not an indication to withhold L-asparaginase.

7.44 Intrathecal Methotrexate Days -7 and 15

Age	1-2 years	2-3 years	> 3 years
Dose	8 mg	10mg	12mg

7.441 Omit if renal failure present and substitute cytarabine (Ara-C).

7.442 Omit if Grade 3 or 4 stomatitis (ulcers and liquid diet only or alimentation not possible) and substitute Ara-C.

7.443 Intrathecal dose of Ara-C

Age	1-2 years	2-3 years	> 3 years
Dose	20 mg	24 mg	30mg

7.444 Patients with a CSF white cell count of $<5 \times 10^6/L$ but with unequivocal lymphoblasts on cytospin will receive additional intrathecal methotrexate on days 8 and 22.

7.5 Documentation of Remission

A bone marrow aspirate will be performed on Day 36, which then becomes Day 1 of the next phase of therapy. If marrow is M1 proceed with next phase. Remission is defined as a normocellular marrow with $<5\%$ blasts present. Any patient who fails to achieve remission on day 36 will be off protocol.

7.51 Therapy is given for 102 weeks (2 years) from documentation of remission

8.0 CNS PREVENTATIVE - CONSOLIDATION THERAPY 6 WEEKS

CNS preventative - consolidation therapy commences provided the patient is in remission and the absolute neutrophil count is $>0.5 \times 10^9/L$ and the platelet count is $>80 \times 10^9/L$. Once begun the first 14 days of chemotherapy will be given without interruption, unless life threatening complications are present (this will almost always only be sepsis). The second phase due on Day 22 should only be commenced if the absolute neutrophil count is $>0.5 \times 10^9/L$ and the platelet count $>80 \times 10^9/L$. Once commenced this pulse should only be interrupted for life threatening complications.

Commence *Pneumocystis* prophylaxis with trimethoprim-sulfamethoxazole (see appendix A1.1).

8.1 CNS PREVENTATIVE THERAPY

8.11 Intrathecal Methotrexate Days 1, 8, 15 and 22

All patients receive intrathecal methotrexate in age related doses (see 7.32).
Send CSF for cytospin.

8.2 CONSOLIDATION

Consolidation commences provided the patient is in remission (see 7.5) and the absolute neutrophil count is $>0.5 \times 10^9/L$ and the platelet count $>80 \times 10^9/L$. Once begun, the first 14 days of chemotherapy will be given without interruption, unless life threatening complications are present (this will almost always only be sepsis).

8.21 Vincristine 1.5 mg/m^2 (maximum dose 2 mg) IV on Days 1 and 8 and on Days 22 and 29 (see 7.41 to 7.414).

8.211 The third dose of vincristine due on Day 22 (and cyclophosphamide and Ara-C, see 8.523) should only be given if the nadir has been passed and the absolute neutrophil count is $>0.5 \times 10^9/L$ and the platelet count $>80 \times 10^9/L$.

8.22 Cyclophosphamide 1000 mg/m^2 IV on Days 1 and 22 (see appendix A1.2).

8.221 Gross haematuria - consider using mesna with subsequent doses.

8.222 Microscopic haematuria - add frusemide to IV fluid regimen and continue IV fluids for at least 24 hours.

8.223 Remember that the second dose of cyclophosphamide commencing on Day 22 (and the vincristine {see 8.511} and the Ara-C {see 8.531}) should only be given if the nadir has been passed and the absolute neutrophil count is $>0.5 \times 10^9/L$ and the platelet count $>80 \times 10^9/L$.

8.23 Ara-C $75 \text{ mg/m}^2/\text{day}$ subcutaneously on Days 1-4, 8-11, and 22-25, 29-32.

8.231 the dose due on Day 22 at the time of the second dose of cyclophosphamide and vincristine (see 8.523) should only be given if the nadir has been passed and the absolute neutrophil count is $>0.5 \times 10^9/L$ and the platelet count $>80 \times 10^9/L$.

8.232 Withhold if bilirubin $>25 \text{ umol/L}$ or transaminases $>2.5x$ upper limit of normal (grade 3 hepatotoxicity).

8.233 Do not modify for rash.

9.0 CONTINUATION THERAPY - 96 weeks

This therapy continues provided complete continuous remission is maintained until 2 years of therapy, from the time of documentation of remission, (see 7.5) has been given.

Need to ensure a regular supply of medication and need to emphasise the importance of compliance. Aim is to avoid where possible interruptions in therapy. Dose reduction may be needed due to cytopenia but uninterrupted therapy at a lower tolerable dose better than interrupted chemotherapy at protocol doses. If neutrophil counts are consistently high despite increasing doses, check lymphocyte count. If > 1.5 suspect non-compliance as an explanation.

CONTINUATION

Continuation therapy only commences if the absolute neutrophil count is $>1.0 \times 10^9/L$ and the platelet count $>100 \times 10^9/L$. Blood counts should be done at least once every 28 days (ie with each VCR) or more frequently if dose adjustment of 6MP is necessary (see 9.32 to 9.35). Liver function tests (LFT's) are recommended every 8 weeks or more frequently if clinically indicated. **Continue** trimethoprim-sulfamethoxazole prophylaxis.

9.1 Vincristine $1.5\text{mg}/\text{m}^2$ IV every 28 days (see 7.41 to 7.414).

9.11 Vincristine and the 5 day pulse of dexamethasone are to be given together every 28 days irrespective of blood count (see 9.21).

9.2 Dexamethasone $6\text{mg}/\text{m}^2/\text{day}$ orally for 5 days every 28 days in 2 divided doses

9.21 Dexamethasone and the IV push of vincristine are to be given together every 28 days irrespective of blood counts (see 9.11).

9.3 6-mercaptopurine $50\text{mg}/\text{m}^2/\text{day}$ continuously

9.31 6MP is given at bed time and without milk products. If vomiting occurs within 2 hours the full dose should be repeated. The aim is to give $350 \text{mg}/\text{m}^2/\text{week}$ as shown in the following table:

MERCAPTOPURINE 50mg/m²/day

surface area	dose per week (tabs)	daily dose
0.47 – 0.53	3.5	half a tablet daily on 7 days
0.54 – 0.6	4	half a tablet daily on 6 days and one tablet on day 7
0.61 – 0.67	4.5	half a tablet daily on 5 days and one tablet daily on 2 days
0.68 – 0.74	5	half a tablet daily on 4 days and one tablet daily on 3 days
0.75 – 0.82	5.5	half a tablet daily on 3 days and one tablet daily on 4 days
0.83 – 0.89	6	half a tablet daily on 2 days and one tablet daily on 5 days
0.9 – 0.96	6.5	half a tablet on one day and one tablet daily on 6 days
0.97 – 1.03	7	one tablet daily on 7 days
1.04 – 1.1	7.5	one tablet daily on 6 days and one and a half tablets on day 7
1.11 – 1.17	8	one tablet daily on 5 days and one and a half tablets daily on 2 days
1.18 – 1.24	8.5	one tablet daily on 4 days and one and a half tablets daily on 3 days
1.25 – 1.32	9	one tablet daily on 3 days and one and a half tablets daily on 4 days
1.33 – 1.39	9.5	one tablet daily on 2 days and one and a half tablets daily on 5 days
1.4 – 1.46	10	one tablet daily on one day and one and a half tablets daily on 6 days
1.47 – 1.53	10.5	one and a half tablets daily on 7 days
1.54 – 1.6	11	one and a half tablets daily on 6 days and two tablets on day 7
1.61 – 1.67	11.5	one and a half tablets daily on 5 days and two tablets daily on 2 days
1.68 – 1.74	12	one and a half tablets daily on 4 days and two tablets daily on 3 days
1.75 – 1.82	12.5	one and a half tablets daily on 3 days and two tablets daily on 4 days
1.83 – 1.89	13	one and a half tablets daily on 2 days and two tablets daily on 5 days
1.9 – 1.96	13.5	one and a half tablets on one day and two tablets daily on 6 days
1.97 – 2.03	14	two tablets daily on 7 days
2.04 – 2.1	14.5	two tablets daily on 6 days and two and a half tablets daily on day 7

- 9.32** An FBC is performed every 28 days prior to each vincristine and dexamethasone pulse. If the neutrophil count drops to between $0.5-1.0 \times 10^9/L$ and/or the platelet count to $50-100 \times 10^9/L$ then both 6-mercaptopurine and methotrexate should be reduced by 25%. The count should then be repeated at weekly intervals.
- 9.33** When counts recover to neutrophils $>1.0 \times 10^9/L$ and platelets $>100 \times 10^9/L$ then resume therapy at standard dose.
- 9.34** If the neutrophil count is $<0.5 \times 10^9/L$ and/or the platelet count $<50 \times 10^9/L$ then oral 6-mercaptopurine and methotrexate are ceased. Upon recovery to neutrophils >1.0 and platelets >100 therapy is resumed at 50% of standard doses and increased to 75% and 100% as tolerated. (This will usually be at 2 week intervals).
- 9.35** For patients who maintain counts of neutrophils $>1.0 \times 10^9/L$ **and** platelets $>100 \times 10^9/L$ for a minimum of 2 weeks the dose of 6-mercaptopurine should be increased to $75 \text{ mg/m}^2/\text{day}$. If this dose is tolerated then the dose should be increased to 100 mg/m^2 . The methotrexate dose remains constant at $20 \text{ mg/m}^2/\text{week}$.
- 9.36** If prolonged cytopaenia > 3 weeks, recommend stopping weekend cotrimoxazole. If still cytopaenic at 4-6 weeks recommend BMA to exclude relapse. Unhelpful often to do an earlier marrow as hypocellular marrows are difficult to interpret, so best to wait.
- 9.4** **Methotrexate 20 mg/m^2 orally weekly** Oral methotrexate is given in the evening together with 6-mercaptopurine (see 9.31) as per following table:

METHOTREXATE 20mg/m ² /week			
surface area	Dose per week (mg)	number of tablets	
		2.5mg	10mg
0.4	7.5	3	-
0.41 – 0.46	8.75	3 ½	-
0.47 – 0.53	10	-	1
0.54 – 0.59	11.25	½	1
0.6 – 0.65	12.5	1	1
0.66 – 0.71	13.75	1 ½	1
0.72 – 0.78	15	2	1
0.79 – 0.84	16.25	2 ½	1
0.85 – 0.9	17.5	3	1
0.91 – 0.96	18.75	3 ½	1
0.97 – 1.03	20	-	2
1.04 – 1.09	21.25	½	2
1.1 – 1.15	22.5	1	2
1.16 – 1.21	23.75	1 ½	2
1.22 – 1.28	25	2	2
1.29 – 1.34	26.25	2 ½	2
1.35 – 1.4	27.5	3	2
1.41 – 1.46	28.75	3 ½	2
1.47 – 1.53	30	-	3
1.54 – 1.59	31.25	½	3
1.6 – 1.65	32.5	1	3
1.66 – 1.71	33.75	1 ½	3
1.72 – 1.78	35	2	3
1.79 – 1.84	36.25	2 ½	3
1.85 – 1.9	37.5	3	3
1.91 – 1.96	38.75	3 ½	3
1.97 – 2.03	40	-	4
2.04 – 2.09	41.25	½	4
2.1	42.5	1	4

- 9.41 Grade 2-4 nephrotoxicity (creatinine >2.6x upper limit of normal) - omit until toxicity resolved (Grade 0, creatinine <1.25x upper limit of normal).
- 9.42 Grade 3-4 hepatotoxicity - omit until Grade 0-2 toxicity then resume at half dose. Escalate dose at 2 weekly intervals, provided Grade 3-4 toxicity does not recur.
- 9.43 Grade 2 stomatitis (erythema, ulcer, can eat solids) of >3 days duration, decrease dose by 30%. Grade 3-4 stomatitis - withhold until resolved and resume dose at 50%.
- 9.44 The dose of oral methotrexate due on the week intrathecal methotrexate is given, but is reduced by the amount of the intrathecal dose (see 9.52).
- 9.45 Dose guidelines for methotrexate follow those listed in 9.32 to 9.35.

9.5 Intrathecal methotrexate in age related doses (see 7.32 to 7.321).

Send CSF for cytospin.

- 9.51 Intrathecal methotrexate is given every 8 weeks during continuation therapy until completion of 12 months of treatment from time of remission (see 9.54).
- 9.52 The dose of oral methotrexate at this time is reduced by the amount of the intrathecal dose (see 9.44).
- 9.53 Intrathecal methotrexate is given every 8 weeks but should be deferred if the absolute neutrophil count is <0.5 x10⁹/L and/or platelet count is <50 x10⁹/L.
- 9.54 **IT MTX is ceased after the first year of therapy** (see 9.51).

9.6 Continuation therapy is given until 2 years of treatment from the time of documentation of remission has been given (see 7.0, 9.0).

9.7 Record details of therapy (when IV vincristine and IT methotrexate/oral 6MP and MTX given) on the flow sheets (to be circulated). This will facilitate protocol review and audit for producing outcome data.

9.8 Non-compliance. If families non-compliant and cease therapy, and the child subsequently relapses, symptomatic treatment will be required. (see 10.5).

10.0 COMPLETION OF THERAPY

Following completion of 2 years of therapy from documentation of remission (see 7.33), a bone marrow aspirate and diagnostic lumbar puncture will be performed. If continuing complete remission is documented therapy is ceased and the patient moves into follow-up. If remission is not documented, then symptomatic treatment will be required.

10.1 Patients will need to be followed at set intervals to document progress including continuing remission and late effects of treatment (if any-expected to be minimal). A full blood count should be performed at

the first visit off treatment and if normal no further blood tests unless clinically indicated.

10.2 When off treatment 6 months, provided well and in remission, re-immunise as per recommended schedule- refer chapter on infections.

10.3 Relapse

10.31 Bone marrow relapse - >25% lymphoblasts irrespective of the proportion of lymphocytes. If marrow rating is M₂ (5-25% lymphoblasts) the marrow should be repeated in 4 weeks time.

10.32 CNS relapse - >5 white cells x10⁶/L plus cytocentrifuge examination confirming morphologically unequivocal lymphoblasts.

10.33 Testicular relapse - unilateral or bilateral testicular enlargement. Biopsy is required to confirm diagnosis.

10.34 All patients should have both bone marrow examination and CSF examination performed at the time of relapse.

10.4 Death.

10.5 Parents' or patient's refusal to follow assigned therapeutic regimen. Follow up data will still be required for these patients.

11.0 SAMPLE PARENT INFORMATION SHEET

Parent Information Sheet

Pacific Acute Lymphoblastic leukaemia Protocol

Your child has acute lymphoblastic leukaemia (ALL). This is a disorder of unknown cause where there is unrestrained growth of abnormal lymphoblasts (primitive white blood cells) in the bone marrow. Because the production of these abnormal cells is uncontrolled the bone marrow is unable to produce usual numbers of normal red blood cells, white blood cells and platelets. Once produced in the bone marrow, the leukaemic cells (lymphoblasts) have the potential to spread to any part of the body.

ALL is now a curable disease in some children. Research has led to the identification of certain features of ALL which are present at diagnosis. Such features are referred to as prognostic features. Depending on the prognostic features present at diagnosis, children with ALL can be divided into subgroups, with some groups having a good chance of cure, and some groups having a poor chance of cure. Children who have a good chance for cure will be offered treatment on this protocol. It is impossible to predict whether an individual child will be cured. This information has been designed to help you understand the principles of treatment of ALL and the way it will be given to your child. Remember there are differences between the features present at diagnosis in children with ALL. It is important to remember this fact when discussing and comparing your child's diagnosis, treatment, and progress with other families.

Your consultant will keep you fully informed. Should you have any questions regarding your child's illness or treatment please ask the staff caring for your child. As leukaemia is an illness which has an impact on the whole family, it is important everybody understands how the treatment is given, and why it is given in the way it is. The family is an equally important part of the treatment team as are the doctors, nurses, social workers, pharmacists, chaplains etc.

Your child will receive standard antileukaemic treatment according to this protocol

The therapy on this protocol is divided into a number of phases. It continues over two years provided the child remains leukaemia free. Your consultant will discuss all aspects of the treatment with you and provide you with a copy of the treatment your child is scheduled to receive. Initial treatment, called prednisone prephase will be given to all patients. A good response to this treatment will allow your child to continue with treatment. The next phase is remission induction. This phase, lasting five weeks is aimed at making the leukaemia disappear. This is achieved in most patients. The ongoing treatment is aimed at preventing return of the leukaemia (relapse). More than 50% of patients should remain free of leukaemia at the end of treatment. The next phase of treatment, called CNS preventative/consolidation therapy lasts six weeks. CNS preventative therapy provides treatment directly to the central nervous system (CNS) by injecting drugs directly into the spinal fluid by

means of a lumbar puncture. This is referred to as intrathecal therapy. Consolidation therapy is also given at this time.

Continuation therapy follows consolidation. This phase lasts until the end of treatment. It consists of oral and intravenous therapy. Intrathecal therapy is given every eight weeks during continuation therapy until one year of treatment is completed.

The following is a list of drugs your child may be given. The treatment may need to be modified according to your child's tolerance and side effects he/she experiences. If you have questions please ask a staff member. The most common side effects are listed below:-

Vincristine (VCR) – Given intravenously

- Skin burn if the drug leaks from the vein
- Constipation
- Jaw pain
- Convulsions
- Hair loss
- Leg pain
- Low blood counts

Prednisone (PDN) – given orally

- Weight gain
- Water retention
- Irritability
- High blood pressure
- Diabetes
- Decreased ability to fight infection

Dexamethasone (DEX) – given orally

- As for prednisone

L-Asparaginase (L-Asp) – given by injection into the muscle

- Allergic reactions
- High blood sugar
- Inflammation of the pancreas
- Liver function abnormalities
- Loss of appetite and lethargy

Methotrexate (MTX) – given intrathecally

- Irritation of the membranes around the brain and spine
- Convulsions
- Headache, backache, fever
- Learning difficulties

Methotrexate (MTX) – given orally or intravenously

- Nausea and vomiting
- Mouth ulcers
- Rash
- Liver or kidney function abnormalities

Learning difficulties
Low blood counts

Cytarabine (Ara-C) – given by injection under the skin or intravenously

Nausea and vomiting
Low blood counts
Rash and fever

Cytarabine (Ara-C) – given intrathecally

As for Methotrexate given intrathecally

Cyclophosphamide – given intravenously

Nausea and vomiting
Hair loss
Low blood counts
Bladder irritation
Infertility (very rare)
Second cancers (very rare)

6-Mercaptopurine (6MP) – given orally

Low blood counts
Liver function abnormalities
Anorexia

Your consultant will discuss in detail all phases of the treatment protocol your child will receive, including the side effects and possible complications associated with treatment. You need to be informed of the range of possible side effects. Some children will experience few of the side effects while other children may experience many. Whilst your child will follow the protocol, the exact treatment received will be adjusted to allow for individual tolerance. Again this may seem to mean differences in treatment of the same disease during discussion with other families.

We hope this information is helpful to you and will enable you, your child and family to understand and cope with the necessary treatment which we hope will achieve cure.

APPENDIX 1

A1.1 *Pneumocystis* prophylaxis

All patients should receive prophylaxis with trimethoprim-sulfamethoxazole (TMP-SMZ). This should commence with the consolidation phase of chemotherapy (section 8). TMP-SMZ then continues throughout therapy.

The dose is 5 mg/kg/day of TMP given in a divided dose (bd) for 2 days/week.

Cotrimoxazole Liquid (240mg/mL) Dose - Twice Daily on Saturday and Sunday			
Weight of Patient (kg)	Suspension 240mg/5ml	Dose of combined cotrimoxazole (mg)	Dose of trimethoprim component (mg)
3 to 3.9	1mL	48	8
4 to 5.5	1.5mL	72	12
5.6 to 7	2mL	96	16
7.1 to 8.8	2.5mL	120	20
8.9 to 10.4	3mL	144	24
10.5 to 12	3.5mL	168	28
12.1 to 13.6	4mL	192	32
13.7 to 15.2	4.5mL	216	36
15.3 to 16.8	5mL	240	40
16.9 to 18.4	5.5mL	264	44
18.5 to 20	6mL	288	48
20.1 to 21.6	6.5mL	312	52
21.7 to 23.2	7mL	336	56
23.3 to 24.8	7.5mL	360	60
24.9 to 26.4	8mL	384	64
26.5 to 28	8.5mL	408	68
28.1 to 29.6	9mL	432	72
29.7 to 31.2	9.5mL	456	76
31.3 to 32.8	10mL	480	80
Cotrimoxazole tablet (480mg) Dose - Twice Daily on Saturday and Sunday			
Weight of Patient (kg)	480mg tablet	Dose of combined cotrimoxazole (mg)	Dose of trimethoprim component (mg)
15 to 22.5	½ tablet	240	40

Cotrimoxazole Liquid (240mg/mL) Dose - Twice Daily on Saturday and Sunday			
22.6 to 37.5	1 tablet	480	80
37.6 to 52.5	1 ½ tablets	720	120
> 52.6	2 tablets	960	160

A1.2 Cyclophosphamide consolidation therapy (section 8.52, 10.21 and 14.21)

- i) Prehydrate with dextrose/saline (0.18% saline + 4% dextrose or 0.3% saline and 3.5% dextrose) + 20mmol/L potassium chloride at 125mL/m²/hr for 2 hours.
- ii) 5HT₃ antagonist (ondansetron) if available, otherwise metoclopramide for nausea and vomiting.
- iii) Give cyclophosphamide 1000mg/m² in 125mL/m² of above fluid over 1 hour OR add cyclophosphamide 1000 mg/m² to 50 mL of N saline or 5% dextrose and infuse over 1 hour as a side line together with hydration fluid at 125mL/m²/hour.
- iv) When cyclophosphamide is completed continue hydration fluid rate at 125mL/m²/hour for 4 hours post cyclophosphamide.

A1.3 Parental handling of oral medication (6MP/MTX)

- i. Wash hands before and after handling tablets.
- ii. For halving tablets either use a pill cutter or a clean knife-dedicated for this use only.
- iii. Gloves are not necessary.
- iv. Store tablets at room temperature.