Cancer Association of South Africa (CANSA)

Fact Sheet on Childhood Acute Myeloid Leukaemia (AML)

Introduction
Leukaemia is a cancer of the white blood cells. All blood cells are produced in the bone marrow, the spongy substance at the core of some of the bones in the body.

Bone marrow contains:

- red blood cells, which will carry oxygen around the body
- platelets, which will help the blood to clot and control bleeding
- white blood cells, which will help to fight infection.

There are two different types of white blood cells: lymphocytes and myeloid cells (including neutrophils). These white blood cells work together to fight infection. Normally white blood cells develop, repair and reproduce themselves in an orderly and controlled way. In leukaemia, however, the process gets out of control and the cells continue to divide in the bone marrow, but do not mature.

These immature dividing cells fill up the bone marrow and stop it from making healthy blood cells. As the leukaemia cells are immature, they cannot work properly. This leads to an increased risk of infection. Because the bone marrow cannot make enough healthy red blood cells and platelets, symptoms such as anaemia and bruising can occur.

There are four main types of leukaemia: acute lymphoblastic (ALL), acute myeloid (AML), chronic lymphocytic (CLL) and chronic myeloid (CML). Chronic leukaemias occur mostly in adults, and are
extremely rare in children and young people. Each type of leukaemia has its own characteristics and treatment.

**Childhood Acute Myeloid Leukaemia (AML)**

Leukaemia is a cancer of the white blood cells. White blood cells help to fight infection.

There are two different types of white blood cell – lymphoid cells (also known as lymphocytes) and myeloid cells. Normally these cells repair and reproduce themselves in an orderly and controlled way. In leukaemia, however, the process gets out of control and the cells continue to divide but do not mature.

Acute myeloid leukaemia is an overproduction of immature myeloid cells, called myeloblasts or blast cells.

Immature myeloid cells fill up the bone marrow and stop it making healthy blood cells. As these cells are immature, they cannot work properly. This puts the child at increased risk of infection. Symptoms such as bruising and anaemia are caused by the bone marrow’s inability to make enough healthy red blood cells and platelets.

**Incidence of Childhood Acute Myeloid Leukaemia in South Africa**

In providing the incidence figures of leukaemia in South Africa, The National Cancer Registry (2014) does not make provision for the reporting of different types of leukaemia – it also does not differentiate between acute and chronic leukaemias.

According to the National Cancer Registry (2014) the following number of childhood leukaemia cases was histologically diagnosed in South Africa during 2014:

<table>
<thead>
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<th>Group – Boys 0 to 19 Years 2014</th>
<th>Actual No of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>All boys</td>
<td>81</td>
</tr>
<tr>
<td>Asian boys</td>
<td>1</td>
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<td>Black boys</td>
<td>49</td>
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<tr>
<td>Coloured boys</td>
<td>12</td>
</tr>
<tr>
<td>White boys</td>
<td>19</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Group – Girls 0 to 19 Years 2014</th>
<th>Actual No of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>All girls</td>
<td>54</td>
</tr>
<tr>
<td>Asian girls</td>
<td>2</td>
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<tr>
<td>Coloured girls</td>
<td>10</td>
</tr>
<tr>
<td>White girls</td>
<td>12</td>
</tr>
</tbody>
</table>

The frequency of histologically diagnosed cases of leukaemia in South Africa for 2014 was as follows (National Cancer Registry, 2014):
### Signs and Symptoms of Acute Childhood Myeloid Leukaemia (AML)

Unlike other cancers Acute Childhood Myeloid Leukaemia (AML) does not occur in stages. Instead, it tends to be found spread throughout the bloodstream at the time of diagnosis, and may have invaded an organ. As a result of its ability to affect the whole body at once, it must be treated aggressively as soon as possible. AML's early symptoms mimic common diseases like the flu, so it can often go undiagnosed.

### Symptoms due to a deficiency of normally functioning cells include the following:

- Cytopaenia (a reduction in the number of blood cells) - can result from a deficiency of normally functioning cells
- Anaemia - characterised by pallor, fatigue, tachycardia, and headache
- Haemorrhage - most commonly, easy bruising, petechiae, epistaxis (nose bleeds), gingival (gum) bleeding
- Frequent persistent infections
- Breathlessness
- Flu-like symptoms
- Fever - should initially always be attributed to infection
- Chills
- Malaise (not feeling well)
- Joint pains

### Diagnosis of Childhood Acute Myeloid Leukaemia (AML)

A number of tests are performed to evaluate a child suspected of having leukaemia. The initial test will be a blood test called a complete blood count (CBC). The treating paediatrician or family doctor...
may order blood tests before referring the child to a specialist. Those tests are often repeated by the oncologist.

Although leukaemia cells may be found in the blood, most commonly the diagnosis and classification of leukaemia is confirmed by looking at a sample of bone marrow under the microscope.

A spinal tap (lumbar puncture) is usually performed to look for leukaemia in the central nervous system.

Following these tests, the doctor may request the laboratory to perform cytogenetics tests (tests that check the leukaemia’s chromosomes for mistakes, also called mutations).

**Treatment of Childhood Acute Myeloid Leukaemia (AML)**

The treatment for AML is often shorter and more intensive than for Acute Lymphoblastic Leukaemia (ALL). The total duration of treatment for AML is around six months and children will usually be admitted to hospital for the full duration of their treatment. This is because the intensive treatment can make children very unwell and they need a high level of supportive care.

The main treatment is chemotherapy. There are two phases of treatment – remission induction and post-remission treatment.

**Remission induction** - the initial aim of treatment for AML is to achieve a state called remission where almost all leukaemic cells have been killed, allowing production of normal blood cells to resume.

Remission induction usually includes one or two blocks of a combination of chemotherapy drugs in high doses given over a few days at intervals of one or two weeks.

**Post-remission treatment** - post-remission treatment (also known as consolidation or post-induction treatment) aims to destroy any remaining leukaemic cells and to prevent the disease from returning. This phase usually involves two or three more blocks of the same drugs used in remission induction.

**About Clinical Trials**

Clinical trials are research studies that involve people. They are conducted under controlled conditions. Only about 10% of all drugs started in human clinical trials become an approved drug.

Clinical trials include:

- Trials to test effectiveness of new treatments
- Trials to test new ways of using current treatments
- Tests new interventions that may lower the risk of developing certain types of cancers
- Tests to find new ways of screening for cancer
The South African National Clinical Trials Register provides the public with updated information on clinical trials on human participants being conducted in South Africa. The Register provides information on the purpose of the clinical trial; who can participate, where the trial is located, and contact details.

For additional information, please visit: www.sanctr.gov.za/

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**Sources and References Consulted or Utilised**

**Blood Cell Formation**
https://www.google.co.za/search?q=blood+formation&source=lnms&tbm=isch&sa=X&ei=inR1U5OAtbTSQRQaQgoG4Dw&sqi=2&ved=0CAIQ_AUoAQ&biw=1517&bih=714&dpr=0.9&sa=c&ved=2ahUxEBw3jczFv7ySAhUyIVoKHYTmDcMQ4dDegQIAtAD

**Children with Cancer UK**
http://www.childrenwithcancer.org.uk/acute-myeloid-leukaemia

**Children's Cancer Research Fund**
http://www.childrenscancer.org/main/acute_myelogenous_leukemia_aml/

**CureSure for Children's Cancer**

**Leukaemia and Lymphoma Research**
http://leukaemialymphomaresearch.org.uk/information/childhood-acute-myeloid-leukaemia/outlook

**Lumbar Puncture**
https://www.google.co.za/search?q=lumbar+puncture&source=lnms&tbm=isch&sa=X&ei=rgR2U42yA_Sw7AaKolEI&sqi=2&ved=0CAIQ_AUoAQ&biw=1517&bih=714&dpr=0.9&sa=c&ved=2ahUxEBw3jczFv7ySAhUyIVoKHYTmDcMQ4dDegQIAtAD

**MacMillan Cancer Support**

http://www.macmillan.org.uk/Cancerinformation/Cancertypes/Childrenscancers/Typesofchildrenscancers/Acutemyeloidleukaemia.aspx#DynamicJumpMenuManager_6_Anchor_1

Medscape