Cancer Association of South Africa (CANSA)

Fact Sheet on Childhood Acute Lymphoblastic Leukaemia (ALL)

Introduction
Leukaemia is a type of blood cancer. The word leukaemia literally means ‘white blood’ and is used to describe a variety of cancers that begin in the blood-forming cells (lymphocytes) of the bone marrow.

Leukaemias are divided into two major types:
- Acute Leukaemia which often progresses rapidly if not treated
- Chronic Leukaemia which usually progresses more slowly

Childhood acute lymphoblastic leukaemia (ALL) is a type of blood cancer that affects the bone marrow, white blood cells, red blood cells, and blood platelets. In the case of ALL too many immature white blood cells (lymphocytes) are manufactured.

Incidence of Childhood Acute Lymphoblastic Leukaemia (ALL)
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>
<tr>
<th>Group – Boys</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>
</tr>
<tr>
<td>Black boys</td>
<td>49</td>
</tr>
<tr>
<td>Coloured boys</td>
<td>12</td>
</tr>
<tr>
<td>White boys</td>
<td>19</td>
</tr>
</tbody>
</table>

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June 2018
The frequency of histologically diagnosed cases of leukaemia in South Africa for 2014 was as follows (National Cancer Registry, 2014):

<table>
<thead>
<tr>
<th>Group – Girls</th>
<th>0 to 19 Years</th>
<th>Actual No of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All girls</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Asian girls</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Black girls</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Coloured girls</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>White girls</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

N.B. In the event that the totals in any of the above tables do not tally, this may be the result of uncertainties as to the age, race or sex of the individual. The totals for ‘all boys’ and ‘all girls’, however, always reflect the correct totals.

**Childhood Acute Lymphoblastic Leukaemia (ALL)**

Leukaemia is the most common childhood cancer worldwide with acute lymphoblastic leukaemia (ALL), an aggressive (fast growing) leukaemia contributing to 76% of all leukaemia cases (PubMed Health Glossary). Hossain, Xie, & McCahan, 2014 states that: “ALL is a malignant blood disorder that originates either from the T- or B-cell lineage, and it is hallmarked by subtype heterogeneity in chromosomal abnormalities, immunophenotypes, and treatment responsiveness.”

**Possible Triggers, Causes and Risks of Childhood Acute Lymphoblastic Leukaemia**

“In children, the most common cancer is leukaemia, predominantly acute lymphoblastic leukaemia (ALL), although these diseases are relatively rare in childhood: depending on the country the incidence rates range from 1.5 to 5.0 per 100 000. Molecular studies have revealed a two-stage origin of many childhood leukaemias: a preleukaemic stem cell clone (initiation and promotion) is thought to be generated in utero and, in a minority of children, the progress to the full-blown disease takes place after birth when a number of postnatal genetic and epigenetic alterations have set in (progression); as in many other malignant neoplasms the nature of pre- and post-natal events involved in leukaemogenesis in children is not well understood.” (Janiak, M.K., 2014). The above findings were also established by Belson, Kingsley, & Holmes (2007) during their research.
Some identified risk factors for childhood acute lymphoblastic leukaemia include:

**Exposure to home paint fumes** - home paint exposure shortly before conception, during pregnancy and/or after birth appears to increase the risk of childhood ALL. The researchers are of the opinion that it may be prudent to limit exposure to home paint fumes during these periods. Bailey, *et al.*, 2011; Bailey, *et al.*, 2015).

According to PubMed Health Glossary (no date), possible causes and risk factors for childhood acute lymphoblastic leukaemia (ALL) include:

- Having been exposed to X-rays before birth
- Previous chemotherapy treatment
- Exposure to radiation
- Genetic conditions:
  - Down syndrome
  - Bloom Syndrome
  - Li-Fraumeni Syndrome
  - Neurofibromatosis type 1
  - Ataxia-telengiectasia
  - Fanconi anaemia
- Mutations in certain genes that stop DNA from repaiding itself
- Having some changes in genes or chromosome

**Signs and Symptoms of Childhood Acute Lymphoblastic Leukaemia (ALL)**

Signs of childhood ALL include fever and bruising.

- Pyrexia (fever)
- Pale skin
- Easy bruising or episodes of bleeding
- Frequent infections
- Flat, pinpoint, dark-red spots under the skin (petechiae)
- Bone or joint pain
- Lumps: underarm, in the neck, groin or abdomen
- Tiredness
- Loss of appetite
- General decrease in energy

(PubMed Health Glossary, no date).

**Diagnosis of Childhood Acute Lymphoblastic Leukaemia**

The following may be used in diagnosis:

- Taking of a complete medical history
- Full physical examination
- Blood chemistry comprising a full blood count with differential cell count
- Chest X-ray
- Bone marrow aspiration and biopsy
• Laboratory test in which the cells in a sample of blood or bone marrow are viewed under a microscope to look for certain changes in the chromosomes in the lymphocytes, e.g. whether it is Philadelphia chromosome-positive

**Treatment of Childhood Acute Lymphoblastic Leukaemia**
The aim of treatment for ALL is to destroy the leukaemia cells and enable the bone marrow to work normally again. Chemotherapy is the main treatment for ALL. The treatment is given in several phases, namely:

- Induction
- Consolidation
- After this consolidation treatment there is a recovery period which is called interim maintenance.
- Possibly further doses of chemotherapy treatment, called delayed intensification, Maintenance treatment
- Bone marrow transplantation (only used for children with ALL that is likely to come back)
- Possible testicular radiotherapy (in some situations because leukaemia cells can survive in the testicles despite chemotherapy)

**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


Cancer Therapy Advisor
http://www.cancertherapyadvisor.com/hematologic-cancers/acute-leukemia-all-quality-life-pediatric-patients-risk/article/656360/?DCMP=EMC-CTA_WeeklyHighlights_20170510&cpn=hemonc_all&hmSubsid=7VmYKZCM_41&hmEmail=Odsi8rxRPdkldpZ00Ap-a5dx4uYfpy9u0&NID=&spMailId=17202225&spUserld=MzMyODk3NTcxNTcs1&spJobId=1020841895&spReportId=MTAyMDg0MTg5NQS2

Childhood Leukaemia
https://www.google.co.za/search?q=childhood+leukaemia+black+child&source=lnms&tbm=isch&sa=X&ei=aYVsU4DYOYJP OcoqOgGqSved=OCAYQ_ALuQA0Q,biw=1517&bih=714&dpr=0.9#fsrc=&imgdii=_&imggclid=eXQMqYAcz2yhsM%253A%3Bx1jdzahsKGOj%253Bhttp%253A%252F%252Fwww.childrenwithcancer.org.uk%252FGetImage.aspx%252FIDMF%252D93bc7d0-7d39-4d02-97f4-fd410c518b85%2526w%252D550%252D6h%252D225%252D225%252D256rc%252Dmc%3Bhttp%253A%252F%252Fwww.childrenwithcancer.org.uk%252Fincidence%3B550%3B225


Environmental Health Perspectives
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817663/


**Leukaemia Foundation**

**National Cancer Institute**
http://www.cancer.gov/cancertopics/pdq/treatment/childALL/HealthProfessional/page1/AllPages#Section_7
http://www.cancer.gov/cancertopics/pdq/treatment/childALL/HealthProfessional/page1
http://www.cancer.gov/cancertopics/pdq/treatment/childALL/Patient/page1
http://www.cancer.gov/about-cancer/treatment/clinical-trials/what-are-trials

**PubMed Health Glossary** (no date).