

МОНГОЛ УЛСЫН БОЛОВСРОЛ, СОЁЛ, ШИНЖЛЭХ УХААН, СПОРТЫН ЯАМ
АНАГААХЫН ШИНЖЛЭХ УХААНЫ ҮНДЭСНИЙ ИХ СУРГУУЛЬ

САНЖААЖАМЦЫН ЭРДЭНЭЧИМЭГ

**МОНГОЛ УЛСЫН ХҮҮХЭД ӨСВӨР ҮЕИЙН ХОРТ ХАВДРЫН
ӨВЧЛӨЛ НАС БАРАЛТЫН СУДАЛГАА**

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Нийгмийн эрүүл мэндийн ухааны магистрийн зэрэг горилсон нэг сэдэвт бүтээл

Улаанбаатар хот
2019 он

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ABSTRACT

Childhood cancer incidence and mortality of Mongolia; 2008-2017

Key word: childhood, cancer, incidence, mortality, rate

Background: According to the statistics of World Health Organization (WHO), Children's Cancer Association and International Cancer Research Center (IARC), an estimated 300,000 new cases of childhood cancer are registered annually, and about 215,000 cancers of them aged 0-14 years; about 85,000 cancers of them aged 15-19 years and 80,000 children die due to the cancer [1-3].

In recent years childhood cancer increased by 13%, over represented in low and middle income countries, which account for 4% of all diagnosed cancer, and less than 1% of all cancers diagnosed in high-income countries, according to the statistics of WHO [4].

In Mongolia the registration of childhood cancer is not sufficiently also don't use to the international childhood cancer classification and the lack of research served as the background of the our study.

Objective: The study was aimed to assess the childhood cancer mortality by age, sex and region, and define the structure of the childhood cancer by the international classification and estimate the perspective of the childhood cancer.

Material and methods: We assessed the incidence, mortality and perspectives of childhood cancer in Mongolia based on registered cancer cases which is registered in 2008-2017. The study was conducted using retrospective and descriptive design. The incidence rate was based on cancer notification form of secondary and tertiary level hospitals and the mortality rate was based on a death certificate and medical history. Information on mortality was clarified from the National Statistics Office. The incidence, mortality and age specific rate were performed using SPSS-22 and MS Excel software. Recent 10 year's trend and perspectives of the incidence and mortality were performed using ARIMA. The ANOVA analyzes was used to evaluate a mean, standard deviation and standard error was.

Results: The childhood cancer incidence rate was 70.8 ± 16.5 (CI 59.0-82.6) per 1 million children. The overall incidence rate of childhood cancer registered 85.0 (30%) in 0-4 years age group, 54.1 (19%) in 5-9 years age group, 66.2 (23%) in 10-14 years age group, 78.0 (28%) in 15-19 years age group. The morbidity rates were the highest in the 0-4 years age group. Cancer incidence rate per 1 million children was 72.9 ± 24.6 (CI 55.2-90.4; min 44.6 max 121.7) in boys and 68.6 ± 12.5 (CI 59.6-77.5; min 53.2 max 90.1) in girls in 2008-2017. The mean 10-year morbidity rate was 74.2% in boys and 68.9% in girls and there was no gender disparities (0.63). By region cancer incidence in 1 million children was 73.6 (20%) in Western region, 65.8 (18%) in Khangai region, 81.6 (23%) in Central region, 73.1 (20%) in Eastern region and 69.5 (19%) in Ulaanbaatar city. In 2008-2017 the mean childhood cancer rate was 73.8 ± 15.4 (CI 62.7-84.9) in Western region, 65.6 ± 32.0 (CI 42.7-88.5) in Khangai region, 80.9 ± 24.5 (CI 63.4-98.5) in Central region, 73.0 ± 38.9 (CI 45.2-100.8) in Eastern region and 68.2 ± 15.6 (CI 57.0-79.3) in Ulaanbaatar city. There wasn't a statistically significant difference between region rates ($P=0.70$). The childhood cancer mean mortality rate was 32.1 ± 4.3 (CI 29.0-35.3) in 1 million children. The mortality rate by age was 35.7(28%) in 0-4 years age group, 27.0 (21%) in 5-9 years age group, 27.4(21%) in 10-14 years age group, 37.8(30%) in 15-19 years age group. The highest mortality rate was in 15-19 aged group ($P=0.54$). By region cancer mortality was 35.9 ± 11.9 (CI 27.3-44.4; min 18.2; max 59.6) in Western region, 30.7 ± 13.1 (CI 21.3-40.1; min 18.2; max 59.6) in Khangai region, 39.3 ± 11.6 (CI 30.9-47.6; min 23.9; max 61.2) in Central region, 29.5 ± 19.4 (CI 15.6-43.4; min 0.0; max 66.6) in Eastern region and 28.8 ± 6.5 (CI 24.1-33.4; min 20.7; max 38.8) in Ulaanbaatar city. There was a statistically significant difference between region rates ($P=0.30$).

According to the estimated childhood cancer rates was 85.0 in 2018, 88.0 in 2019, 92.0 in 2020, 95.0 in 2021 and 99.0 in 2022 and average confidence interval was CI56.9-129.9 in 2018-2022. The overall incidence of childhood cancer is expected to increase by 3.0.

Conclusion: The average childhood cancer incidence rate per 1 million children was 70.8 ± 16.5 (CI 59.0-82.6) in 2008-2017. The incidence rate is likely to increase over the next 10 years ($P=0.01$). The incidence rate was the highest (85.0 per 1 million children) in the 0-4 years age group ($P=0.03$), there was no gender disparities (0.63). The highest incidence rate was in central region but there wasn't a statistically significant difference between region ($P=0.70$).

The childhood cancer mean mortality rate was 32.1 ± 4.3 (CI 29.0-35.3) per 1 million children. The highest morbidity rate was in 15-19 years age group and in Central region. But there wasn't a statistically significant difference between region and age group

By international childhood cancer classification-3 the most common childhood cancers in Mongolia are: Leukemias, myeloproliferative disease, and myelodysplastic diseases, CNS and miscellaneous intracranial and intraspinal neoplasms, Malignant bone tumors, Lymphomas and reticuloendothelial neoplasms, Germ cell tumors, trophoblastic tumors, and neoplasms of gonads. But by international classification of disease¹⁰ the most common childhood cancers in Mongolia are: 1st leukemia, 2nd central nervous system cancer, 3rd joint bone cancer, 4th lymphoma, 5th soft tissue cancer.

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НОМ ЗҮЙ

1. Steliarova-Foucher E, Colombet M, Ries L, et al. International incidence of childhood cancer, 2001–10: a population-based registry study. *Lancet Oncol.* 2017;18(6):719-731. [PMC free article] [PubMed] [Google Scholar]
2. Steliarova-Foucher E, Fidler MM, Colombet M, et al. Changing geographical patterns and trends in cancer incidence in children and adolescents in Europe, 1991–2010 (Automated Childhood Cancer Information System): a population-based study. *Lancet Oncol.* 2018;19:1159-1169. [PMC free article][PubMed] [Google Scholar]
3. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2018;2018:394-424. [PubMed] [Google Scholar]
4. International Childhood Cancer Day. February 15, 2018. <http://www.internationalchildhoodcancerday.org>
5. International Childhood Cancer Day. February 15, 2019. <http://www.internationalchildhoodcancerday.org>
6. Latest statistics show thah global occurrence of childhood cancer is greater than previously though. <https://www.acco.org/global-childhood-cancer-statistics>
7. Эрүүл Мэндийн үзүүлэлтүүд 2017 он. ЭМЯ. ЭМХТ
8. Эх дэлхийгээ шинэчилье: 2030 он хүртэлх Тогтвортой Хөгжлийн Хөтөлбөр. НҮБ Ерөнхий Ассамблей 2015 он 9 сарын 25 баталсан тогтоол A/70/1. Хуудас 15 тал.
9. Cancer in children. Children in low-income countries continue to have worse acnecr-related outcomes than those in high-income countries. The cancer atlas. <http://canceratlas.cancer.org/the-burden/cancer-in-children>
10. "Child". The Free Dictionary.com. Retrieved 5 January 2013.
11. Steliarova-Foucher E, Colombet M, Ries LAG, et al. *International Incidence of Childhood Cancer, Volume III (electronic version)*. International Agency for Research on Cancer: Lyon, France, 2017.
12. Chen Q, Guo Z, Liu S, et al. The cancer incidence and mortality among children and adolescents during the period of 2010-2014 in Henan Province, China. *Cancer Med.*

- 2019;8:814–823. 10.1002/cam4.1952[PMC free article] [PubMed][CrossRef]
[Google Scholar]
13. Jasim N Al-Asadi, Sarah J Ibrahim. Childhood cancer incidence in Basrah, Iraq During 2012-2016. Asian Pac J Cancer Prev. 2018;16:431–5. [PubMed] [Google Scholar]
 14. L. Yang, J. Fujimoto, D. Qiu, N. Sakamoto, et.al. Childhood cancer in Japan: focusing on trend in mortality from 1970 to 2006. Department of Maternal and Child Health, National Research Institute for Health and Development; National Research Institute for Health and Development, Tokyo, Japan. Received 11 July 2008;
 15. "Convention on the Rights of the Child" (PDF). The Policy Press, Office of the United Nations High Commissioner for Human Rights. Archived from the original (PDF) on 31 October 2010.
 16. Mosby, Inc (2013). Mosby's Dictionary of Medicine, Nursing & Health Professions. Elsevier Health Sciences. p. 345. ISBN 0323074030
 17. Rathus SA (2013). Childhood and Adolescence: Voyages in Development. Cengage Learning. p. 48. ISBN 1285677595
 18. Cancer.Net Editorial Board, 10/2018
 19. Чимгээ Г, Түвшингэрэл С, нар. Хорт хавдраар өвчилсөн хүүхдийн тохиолдол, оношлогоо, эмчилгээний асуудалд. МонголМед, 2009. 1(5)
 20. Түвшингэрэл С, Эрдэнэчимэг С. Хүүхдийн хорт хавдрын өвчлөл 2006-2010 он. ЭМШУИС. НЭМС.ЭШХ-2014 эмхтгэл 44 дугаар тал
 21. Чимэдцэрэн С, Энхсайхан Л, Пүрэвсүрэн А, Бямбаа Б, Сарангоо С, Батбаатар Г. АШУҮИС. Цочмог лейкозтой хүүхдийн эсийн дархлаа чадамжийн өөрчлөлт. (Судалгааны өгүүлэл) Монголын анагаах ухаан, 2005, 2(132)
 22. Баярбат Ц, Attarbaschi A, Dworzak M, Mann G. АУС, ЭМШУИС St. Anna Children's Hospital, Vienna, Austria. Хүүхдийн цочмог лейкокийн BFM протокол хими эмчилгээний үр дүн. (Судалгааны өгүүлэл) Эрүүл Мэндийн Шинжлэх Ухаан, 2014, 11(2)(30)
 23. Steliarova-Foucher E, Stiller C, Lacour B, Kaatsch P. International Classification of Childhood Cancer, third edition. Cancer. 2005;103(7):1457-1467. [PubMed] [Google Scholar]
 24. Childhood Classification/Steliarova-Foucher et al. CANCER April 1, 2005 / Volume 103 / Number 7
 25. Өвчний олон улсын ангилал-10. Боть I. х 77-122. (ICD-10)
 26. Өвчний олон улсын ангилал хавдар судлал-3 ном. (ICDO-3)

27. Kaatsch P, Haaf G, Michaelis J. Childhood malignancies in Germany: methods and results of a nationwide registry. Eur J Cancer 1995;31A:993–9
28. https://www.unicef.org/.../CRC_mongolian_language_version.pdf - хуудас 1-д
29. Дэмбэрэл Б. <http://mongolmed.mn/article/884>. Нийгмийн эрүүл мэнд судлал (лекцийн эмхэтгэл). 3 дэвтэр. УБ., 1996
30. Оргил Б.(PhD.Prof). Монгол хүний амьдралын счлөгийг үе шат болгон ангилах нь. Тойм өгүүлэл. Шинэ санаа,Шинэ нээлт, 2008, 3(5-3)
31. Eun Shil Cha,¹ Kyoung Ae Kong,² Eun Kyeong Moon,¹ Young-Ho Khang,³ and Won Jin Lee¹¹Department of Preventive Medicine, College of Medicine, Korea University, Seoul, Korea. Page 26
32. Эрүүл мэндийн үзүүлэлтүүд 2008-2017 он.ЭМХТ.
33. Cancer Today. <https://gco.iarc.fr/today/home>.By IARC.fr
34. Eva Steliarova-Foucher, Ph.D.¹ Charles Stiller, M.Sc.² Brigitte Lacour, M.D.³ Peter Kaatsch, Ph.D.⁴ International Agency for Research on Cancer, Lyon, France. ICC-3 Cancer 2005;103: 1457– 67. © 2005 American Cancer Society.
35. Tuvshingere SI, Erdenechimeg S. Epidemiological characteristics of childhood cancer in Mongolia. Program and Book of Abstracts. Page 46. 31st Annual Scientific Congress and Meeting of the International Association of Cancer Registries. IARC & NCRA Sheraton New Orleans,Louisiana. 3-5 June 2009.
36. Definition of key terms Consolidated ARV guidelines, June 2013 WHO
37. Батзориг Б, Хүдэрчулуун Н, Ганчимэг Ө, Сэр-Од Х, Билэгт Б. Биостатистик ном. 2011 он.
38. Eva Steliarova-Foucher, Charles Stiller,M.Sc, Brigitte LAcour, Peter Kaatsch. International Classification of Childhood Cancer, Third Edition. CANCER April 1, 2005 / Volume 103 / Number 7
39. Самбуупүрэв Д. Хорт хавдрын тухай ойлголт.2002 он. ҮТНС.
40. Чимэдсүрэн О. Эпидемиологи. Улаанбаатар, 2008
41. Буджав Л. Анагаах ухааны статистикийн судалгааны арга зүй ба арга. 2000
42. Дэмбэрэлсүрэн Ж , нар Эрүүл мэндийн судалгааны арга зүй. 2001
43. Дэмбэрэлсүрэн Ж. Ангаах ухааны статистикийн хичээлийн тойм. 2004
44. Эвлэгсүрэн С. Төгсдэлгэр С. Эрүүл мэндийн статистик ДЭМБ. 2004
45. Theodore H Tulchinsky. The New Public Health. 2005.
46. Дамдинсүрэн А. Эрүүл мэндийн статистик. Улаанбаатар 2008
47. Алтанхуяг П, Батзориг Б, нар. Эрүүл мэндийн мэдээллийг эрхлэн гаргагч, хэрэглэгчдэд зориулсан агрын авлага. Улаанбаатар. 2012

48. Еркебулан М. MiniTab програмын гарын авлага. 2018
49. Stiller CA & Draper GJ. The epidemiology of cancer in children (Chapter 1). In: Voute PA, Barrett A, Stevens MCG, Caron HN (Eds): Cancer in Children: Clinical Management. New York: Oxford University Press, 5th Edition, 2005 (ISBN: 0-19-852932-5), pp.1-16.
50. www.WHO. Dification of key terms.
51. *Parkin DM, Kramarova E, Draper GJ, Masuyer E, Michaelis J, Neglia J, Qureshi S, Stiller CA* (Eds). International Incidence of Childhood Cancer, vol 2, Lyon, France: IARC Scientific Publication No. 144; 1998. (provides age-, sex-, (race-, in some instances), and diagnosis-specific incidence rates for over 50 countries (and within countries) using cancer registries primarily for the period 1980-1990
52. *Little J*. Epidemiology of Childhood Cancer. IARC Scientific Publications, Vol. 149, Lyon, France: IARC, 1999
53. <http://clinicaltrials.gov/ct/show/NCT00015587> UK Children's Cancer Study Group (UKCCSG) <http://www.ukccsg.org.uk>
54. Childhood Cancer Research Group (CCRG). <http://www.ccrq.ox.ac.uk>
55. CCRG Epidemiology of Childhood Cancer Project.
<http://www.nrr.nhs.uk/ViewDocument.asp?ID=M0005106841> National Registry
56. 36. Childhood Tumours
(Oxford) <http://www.lshtm.ac.uk/docdat/records.php?t=records&id=NRCT> (See also [Stiller, 1995](#))
57. Northern Region Young Person's Malignant Disease Registry (UK) [StudiesPubMed Search](#)
58. Yorkshire Specialist Register of Cancer in Children & Young People (UK) [StudiesPubMed Search](#)
59. Inter-Regional Epidemiological Study of Childhood Cancer (IRESCC) [PublicationsPubMed Search](#)
60. Northern & Yorkshire Cancer Registry & Information Service <http://www.nycris.org.uk>
61. [ACCIS](#) European Childhood Cancer Registries <http://www-dep.iarc.fr/accis/commentary/commentaries.pdf>
62. Childhood cancer etiology: reports by Ross & Davies: [2005](#) & [2004](#) & [2003](#) University of Minnesota Cancer Center: Causes of Childhood Cancer (C3) Newsletter
63. <http://www.cancer.umn.edu/page/risk/c3main.html>
64. [Childhood Cancer & Environment \(CHEC Report\)](#)
65. <http://www.checnet.org/report/checreportPART4.pdf>

66. SCEHSC Childhood Cancer Research Core

<http://hydra.usc.edu/scehsc/research/childhood%20cancer/childcancer.asp>

67. Internet Resources for

Cancer <http://www.pitt.edu/~super1/lecture/lec0192/w030int.htm>

68. Children's Cancer Web Internet Resources <http://spade39.ncl.ac.uk/ccw>

69. Childhood Cancer Epidemiology Links: <http://www.cancerindex.org/ccw/guide3k.htm>

70. Genetic Epidemiology of Childhood Cancer

Links <http://www.cancerindex.org/geneweb/gchild.htm>

71. SEER Cancer Among Adolescents 15-19 Years

Old <http://seer.cancer.gov/publications/childhood/adolescents.pdf>

72. IARC Automated Childhood Cancer Information System

<http://www-dep.iarc.fr/accis.htm>

73. IARC GLOBOCAN 2002 (Cancer incidence, prevalence and mortality in the world)

<http://www-dep.iarc.fr> (Download Page)

74. www.1212.mn