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"ХӨХ МОНГОЛ ПРИНТИНГ“ ХХК-д хэвлэв.
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<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<tr>
<td>APSED</td>
<td>Asia Pacific Strategy for Emerging Diseases</td>
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<tr>
<td>CD</td>
<td>Communicable disease</td>
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<tr>
<td>EOC</td>
<td>Emergency Operations Center</td>
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<tr>
<td>FETP</td>
<td>Field Epidemiology Training Programme</td>
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<tr>
<td>HCV</td>
<td>Hepatitis C virus</td>
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<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>HPV</td>
<td>Human Papillomavirus vaccination</td>
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<tr>
<td>KAP</td>
<td>Knowledge, attitude and practice</td>
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<tr>
<td>NCD</td>
<td>Non-communicable disease</td>
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<td>NCC</td>
<td>National Cancer Center</td>
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<td>NCCD</td>
<td>National Center for Communicable diseases</td>
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<td>NCZD</td>
<td>National Center for Zoonotic Diseases</td>
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<tr>
<td>MDR</td>
<td>Multidrug Resistance</td>
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<tr>
<td>MERS</td>
<td>Middle Eastern Respiratory Syndrome</td>
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<tr>
<td>MNUMS</td>
<td>Mongolian National University of Medical Sciences</td>
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<tr>
<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
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<td>PCV</td>
<td>Pneumococcal conjugate vaccines</td>
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<td>PFAA</td>
<td>Perfluoroalkyl Acids</td>
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<td>PHEP</td>
<td>Public health emergency preparedness</td>
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<td>PHI</td>
<td>Public Health Institute</td>
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<td>PSA</td>
<td>Public service announcement</td>
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<tr>
<td>RED</td>
<td>Reaching Every District</td>
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<tr>
<td>RSV</td>
<td>Respiratory Syncytial Virus</td>
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<tr>
<td>RT</td>
<td>Reverse transcription</td>
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<tr>
<td>LAMP</td>
<td>Loop-mediated isothermal amplification</td>
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<td>SDG</td>
<td>Sustainable Development Goals</td>
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<td>SIA</td>
<td>Supplementary immunization activity</td>
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<td>SHSS</td>
<td>Subnational Health System Strengthening</td>
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<td>STI</td>
<td>Sexually transmitted infections</td>
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<tr>
<td>SWOT</td>
<td>Strengths, Weaknesses, Opportunities &amp; Threats</td>
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<tr>
<td>TB</td>
<td>Tuberculosis</td>
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<tr>
<td>UB</td>
<td>Ulaanbaatar</td>
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<tr>
<td>UHC</td>
<td>Universal Health Coverage</td>
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<tr>
<td>UNSW</td>
<td>University of New South Wales</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>USA</td>
<td>United States of America</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>WPRO</td>
<td>Western Pacific Regional Office</td>
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<td>WASH</td>
<td>Water and Sanitation Hygiene</td>
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WELCOME ADDRESS TO PARTICIPANTS OF INTERNATIONAL CONFERENCE ON "TACKLING INFECTIOUS DISEASES: INFORMATION FOR ACTION"

Dear distinguished guests and representatives,

On behalf of the Government of Mongolia and myself I send my sincere greeting to the distinguished guests, representatives and participants of the international conference on “Tackling infectious diseases: Information for Action”.

Influenza pandemics, Ebola and Zika outbreaks have caused extensive loss to the global health and economy. For instance, the Zika outbreak in many countries, started from Brazil in 2015, has showed us that there are no limitations to the spread of infectious disease and the preparedness to potential threat is necessary.

As the result of various measures to control communicable diseases by the Government and people of Mongolia, morbidity of some diseases has fallen significantly in our country and non-communicable disease has become the priority area. Nevertheless new and emerging infectious diseases are still threatening.

Therefore, the Government of Mongolia has issued a comprehensive platform to control of communicable diseases including tuberculosis, HIV and measles in 2016-2020.

I give great significance to this conference since the collaboration between not only health sectors but also agriculture, education, inspection and emergency management, and international organizations are critical in preventing and control communicable diseases, new and emerging infections and human health safety.

I believe that evidence-based and efficient recommendations on health safety, prevention and mitigation of infectious disease will be developed based on the conference reports.

I wish the best of luck to the international conference.

PRIME MINISTER OF MONGOLIA
ERDENEBAT JARGALTULGA
Greetings to you all,

First of all, I would like to thank personally and on behalf of the Government of Mongolia and the Ministry of Health all the delegates, Dr. Mark Jacobs, Director, Communicable diseases for WHO’s Western Pacific Region and all the leading experts, researchers and all the organizations who cooperate with Mongolian Government and our ministry for accepting our invitation and attending this conference.

This conference is significant for being organized shortly after the updated Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III) at the 67th session of the World Health Organization Regional Committee for the Western Pacific in Manila.

During the discussion on the strategy, I expressed my request to collaborate with WHO on improving surveillance and control of tuberculosis, HIV/AIDS and STIs, health security programme even though Mongolia is not the priority country of the region.

Although support and cooperation of international organizations in fighting and preventing infectious diseases is important, there is much we can do by our own initiative and involvement.

For instance, the Government Action Plan for 2016-2020 specifies to develop and implement the 3rd National Programme to Fight Communicable Diseases and to take comprehensive measures to prevent HIV infection, TB, STIs and such projects as to reduce the price of hepatitis C medications and to expand the immunization for adults against Hepatitis B viral infections have been already launched. I believe organizing this conference in the beginning of the first year of the Government will help set the right course for our future activities.

While we acknowledge significant achievements and success in the area of prevention and combatting communicable diseases in the past, the present demands us more innovative, rapid and evidence-based decision-making.

Addressing the communicable diseases beyond the health sector means by incorporating this fight into the policies, agendas and actions of non-health sectors would be the optimal way to overcome our current situation ridden by economic crisis.

In our fight and prevention measures against communicable diseases the unique thing is that we can never become complacent because of eradication
or elimination or substantial reduction in the prevalence. This fact has been demonstrated by the outbreak of measles in our country.

Therefore, it is essential to update our policy on infectious diseases, to continually introduce advanced technologies of surveillance, monitoring and evaluation, treatment and diagnostics in the timely manner, to develop inter-sectorial cooperation and regional partnership in ensuring preparedness.

We believe the results and findings of the studies discussed at this conference as well as the recommendations to be issued thereof shall provide a tangible contribution to the control and prevention of infectious diseases ushering in a new level of this work.

I would like to wish all the best to everyone in your research works and announce that the conference has been officially opened.

Thank you for your attention.
Opening Speech of Dr Soe Nyunt U, WHO Representative in Mongolia at the International Conference on Infectious Diseases "Tackling Infectious Diseases: Information for Action"

Honourable Prime Minister of Mongolia, Mr. Erdenebat Jargaltulga
Honourable Minister of Health, Dr. Tsogtsetseg Ayush,
Honourable Cabinet Members, representatives of Government agencies,
Esteemed public health professionals, doctors, scholars, scientists,
representatives of the health professionals associations and societies, Mongolian civil society organizations, international and media partners;
Distinguished guests, Conference participants, ladies and gentlemen,

Good morning and very warm welcome to all the esteemed participants of the International Conference on Infectious Diseases jointly organized by WHO and Mongolia’s Ministry of Health and its agencies.

As you may have noticed the title of our Conference is self-explanatory: the Conference aims at providing an up-to-date evidence to policy and decision makers, informing relevant national programmes, civil society and other stakeholders about burden of infectious diseases in Mongolia, sharing results and best practices on prevention and control of infectious diseases, and discussing the potential policy change and future research collaboration in the areas of infectious diseases. The Conference agenda is quite wide: we’ll present new data on tuberculosis prevalence in Mongolia, we’ll talk about the burden of HIV and viral hepatitis, the epidemic of sexually transmitted infections, we’ll also have presentations and deliberations on vaccine-preventable, emerging and re-emerging diseases, zoonotic diseases, WASH, and water safety and quality.

You may still wonder why have we gathered to discuss the topic of infectious diseases particularly at this time in Mongolia?

As we all know much has been achieved in the world, in the Western Pacific Region and in Mongolia in particular in controlling the burden and spread of communicable diseases through immunizations, infectious disease control programmes and fostering international cooperation in the field of prevention and control of communicable diseases. Significant progress had been made in improving surveillance, human resource development through Field Epidemiology Training Programme, and in upgrading laboratory capacities for diagnosis of priority and unknown diseases. It’s also important to acknowledge the efforts made in ensuring multi-sectoral coordination in emergency response.

However, unfortunately, at the same time Mongolia today has been undergoing a notable rise in infectious diseases: the new evidence released by the first ever TB prevalence survey shows that the TB prevalence in Mongolia is much higher than estimated previously by the National TB Programme and WHO; the data on spread of STIs repetitiously suggests that Mongolia is facing a silent epidemic of
STIs with increasing number of congenital syphilis cases: 52 cases in 2015 alone, which demonstrates serious problems in the country’s health system. The sad fact is that women who have syphilis, gonorrhoea and HPV today have a high chance of ending up with cervical cancer, infertility and pelvic inflammatory diseases in 10-15 years from now. Since March 2015 Mongolia has been struggling with the measles outbreak that took away over 100 babies’ lives in 2016. Nationwide measles outbreak tested our preparedness and response capacity. It revealed major issues and inefficiencies with surveillance, risk assessment and risk communication. Should the health system response have been adequate and should the health sector haven’t fallen prey to political instability, systemic lack of multi-sectoral and inter-sectoral collaboration and plain managerial irresponsibility these innocent babies would not have died from a vaccine-preventable disease causing deepest pain to their parents and families. The number of food-poisonings with bacteria and chemicals especially in school and kindergartens long become a regular occurrence. Food and water safety remains being an issue in the country despite of notable efforts made especially in terms of ensuring water safety. Infectious diseases still account for a high proportion of disability-adjusted life years and are of significant socioeconomic importance due to their potential for causing outbreaks and health emergencies. Poor response to emergencies results in loss of lives and brings economic challenges and political instability. Expenses may rise into several-fold liabilities and cause major international emergency situation.

We live in a highly interconnected world. The only certainty is uncertainty. In the recent past, we were faced with public health events at global and regional levels. Challenges continue to exist in national readiness to respond to large-scale and complex events in an effective and coordinated way. Endemic, well-known diseases that can be prevented by vaccines can become national and international public health events. Let’s recall the recent measles outbreak in Mongolia. In the midst of the outbreak many health professionals were asking themselves what happens in the face of unknown, new diseases if we are not able to effectively manage known, vaccine-preventable diseases? The threat from emerging diseases and other public health events is ever-present and vulnerability is universal. The risks are continued, the job is never finished. Health security work is never complete. Certain risks have the potential to increase in the future posing significant threat to the national health security. As evidenced by recent public health events that caused international concerns, namely the Ebola virus disease, MERS, Zika virus and yellow fever outbreaks, public health events can impact the overall social and economic well-being of a country. Strengthening public health emergency preparedness and response capacities, which include surveillance, risk assessment, laboratory capacity, risk communication and emergency operations is an effective approach that will result in a more efficient use of resources, the avoidance of unnecessary vertical programmes and more sustainable health systems. That is why we welcome MoH taking pro-active approach to preparedness through functional Emergency Operations Centre.

WHO views this Conference as a platform for a frank and open conversation, exchange of information and ideas and most importantly, recommendations and suggestions to guide our way forward in making the much needed rapid progress in this area. We cannot afford losing more babies to vaccine-preventable diseases, we must not have any more cases of a congenital syphilis in the lower-middle income country of XXI century, we cannot continue losing productive age people to hepatitis
B and C viruses, we cannot continue allowing non-safe foods and water to be consumed by our children.

All of the issues to be highlighted at the Conference are not the responsibility and the “headache” of the health sector alone. Human health is a crosscutting area requiring a dedicated and evidence-based multi-sectoral cooperation. I’d like to repeat again and again: health issues are the responsibility of the whole of government and the whole of society. Hence we have invited representatives of the Ministry of Education, Culture, Sciences and Sports, Ministry of Labour and Social Protection, Ministry of Environment and Tourism and civil society representatives including the national media.

WHO calls this approach, the way of doing, and the outcome we strive for, “Health in All”. It indeed is the time when we, as a society, accept the simple truth that to reach “Health in All” we need to work together.

We are proud to organize this Conference particularly at a time when the new Government has just assumed its responsibilities and approved its Programme of Action for the next four years. Expectations of the Mongolians from this Government are high and as always WHO will stand next to the Government of Mongolia and its Ministry of Health as well as Mongolia’s civil society to achieve the “Health in All” objective, to make sure that no one is left behind in accessing quality and acceptable health services when needed, regardless of financial abilities, putting the Universal Health Coverage at work.

I’d like to highly acknowledge the Government leadership and commitment in improving the country’s health sector and thank all public health professionals for their dedicated work. I hope that this Conference will lead to some decisive multi-sectoral steps in tackling the epidemic of infectious diseases in Mongolia based on new evidence presented and tapping into the rich pool of knowledge, ideas and practices shared by our esteemed participants.

I wish you fruitful deliberations and innovative solutions so the evidence presented at this Conference may inform necessary actions to be taken by the Government as a whole, by the Ministry of Health, by its agencies, by professional organizations, by civil society actors, by the media and by the international community including the UN agencies and bilateral partners, to make sure that every Mongolian is healthy and that Mongolia is well on its way to achieving the Sustainable Development Goals.
### TACKLING INFECTIOUS DISEASES:
INFORMATION FOR ACTION
INTERNATIONAL CONFERENCE AGENDA

**October 20, 2016 (Diamond Meeting Hall)**

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<td>8:30~9:00</td>
<td>Registration</td>
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<tr>
<td>9:00~9:15</td>
<td>Opening ceremony (traditional music “Morin khuuriin tatлага”)</td>
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<tr>
<td>9:15~9:45</td>
<td><strong>Opening session:</strong></td>
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<tr>
<td>9:15~9:45</td>
<td>• Dr. Tsogtsetseg A, Minister of Health</td>
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<td>9:15~9:45</td>
<td>• Greetings from Prime Minister Erdenebat J</td>
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<td>9:15~9:45</td>
<td>• Dr. Soe Nyunt-U, WHO Representative in Mongolia</td>
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<td>9:45~10:00</td>
<td>Group photo</td>
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<td>10:00~10:20</td>
<td>Refreshment break</td>
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**PLENARY SESSION**

**Moderators:**
- Dr. Ochirbat D, State Secretary, MOH
- Dr. Mark Jacobs, Director of Communicable Diseases, WHO, WPRO

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<tr>
<td>10:20~10:40</td>
<td>The current situation of infectious diseases and future directions</td>
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<td>10:20~10:40</td>
<td>Dr. Tsogtsetseg A, Minister of Health</td>
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<tr>
<td>10:40~11:00</td>
<td>Global and regional priorities on prevention and control of infectious diseases</td>
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<td>11:00~11:20</td>
<td>Moving towards universal health coverage in Mongolia through strengthening</td>
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<td>11:00~11:20</td>
<td>subnational health systems</td>
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<tr>
<td>11:00~11:20</td>
<td>Dr. Soe Nyunt-U, WHO Representative in Mongolia</td>
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<td>11:20~11:40</td>
<td>Dr. Anthony O. Eshofonie, Epidemiologist, Division of Security and Emergency, WHO</td>
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<td>11:40~12:00</td>
<td><strong>Question &amp; Answer</strong></td>
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<td>12:00~13:30</td>
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**Moderators:**
- Dr. Enkhbold S, Director of Policy Implementation Coordination, MOH
- Dr. Woojin Lew, Senior Programmer Coordinator, WHO Mongolia

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<td>13:30~13:45</td>
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<td>13:45~14:00</td>
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<td>13:45~14:00</td>
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<td>14:00~14:10</td>
<td><strong>Question &amp; Answer</strong></td>
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<td>14:10~14:25</td>
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<td>Time</td>
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<td>14:25-14:40</td>
<td><strong>Current status and challenges of WASH</strong></td>
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<td><em>Dr. Urantsetseg Sh, officer, Department of Policy Implementation</em></td>
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<td>14:40-14:55</td>
<td><strong>Preliminary results of microbiology laboratory review</strong></td>
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<td><em>Dr. Enkhtuya J, Quality manager of Proficiency testing laboratory,</em></td>
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<td><em>Institute of Veterinary Medicine</em></td>
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<td>14:55-15:05</td>
<td><strong>Question &amp; Answer</strong></td>
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<td><strong>Refreshment break</strong></td>
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<td>Moderators:</td>
<td><em>Dr. Narangerel D, Director of Emergency operating center, MOH</em></td>
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<td><em>Dr. Nick Walsh, Medical Officer on Viral Hepatitis, WHO, WPRO</em></td>
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<td>15:30-15:45</td>
<td><strong>Findings of the first national TB prevalence survey in Mongolia</strong></td>
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<td><em>Dr. Tugsdelger S, Director of monitoring and evaluation,</em></td>
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<td><em>Internal auditing department, MOH</em></td>
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<td>15:45-16:00</td>
<td><strong>STREAM clinical trial: improving patients care and management of MDR-TB</strong></td>
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<td><em>Dr. Bazarragchaa Ts, Principle investigator,</em></td>
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<td><em>STREAM clinical trial, NCCD</em></td>
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<td>16:00-16:10</td>
<td><strong>Question &amp; Answer</strong></td>
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<td>16:10-16:25</td>
<td><strong>Human Papillomavirus (HPV) vaccination experience in Australia</strong></td>
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<td><em>Prof. Basil Donovan, Head Sexual Health Programme,</em></td>
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<td><em>Kirby Institute, UNSW</em></td>
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<td>16:25-16:40</td>
<td><strong>Results of detecting and identifying of human Papillomavirus and other</strong></td>
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<td><em>causative agents of sexually transmitted infections using nucleic acid</em></td>
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<td><em>based flow-through hybridization microarray method in genital tract samples</em></td>
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<td><em>Dr. Binderya G, Head of Microbiology and Molecular biology laboratory,</em></td>
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<td><em>Gyals medical center, Mongolia</em></td>
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<td><strong>Economic impact on HCV treatment in Mongolia and other countries of Western</strong></td>
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<td><em>Dr. Nick Walsh, Medical Officer on Viral Hepatitis, WHO, WPRO</em></td>
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<td>17:05-17:20</td>
<td><strong>The burden of cancers attributable to infections: worldwide and Mongolia</strong></td>
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<td><em>Acad. Nymadawa P, Mongolian Academy of Medicine and Sciences</em></td>
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<td>17:20-17:30</td>
<td><strong>Question &amp; Answer</strong></td>
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<td><strong>Closing</strong></td>
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<td>17:40-19:00</td>
<td><strong>Welcome reception (Sapphire conference hall)</strong></td>
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### October 21, 2016

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| 08:30-9:00 | **Sapphire Meeting Room**  
Parallel Session 1.  
STI, HIV/AIDS  
- Dr. Unurjargal A, Officer in charge of HIV, STI and TB, MOH  
- Prof. Basil Donovan, Kirby Institute, UNSW Australia |
| 08:30-9:00 | **Crystal Meeting Room**  
Parallel Session 2.  
Immunization  
- Dr. Narangerel D, Head of EOC, MOH  
- Dr. Mark Jacobs, Director, Division of Communicable Diseases, WHO, WPRO |
| 08:30-9:00 | **Topaz Meeting Room**  
Parallel Session 3.  
Emerging and re-emerging infections  
- Dr. Tsogbadrakh N, Director, NCZD  
- Dr. Anthony O.Eshofonie, Epidemiologist, Division of Security and Emergency, WHO, WPRO |

#### 09:00-12:00

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<tr>
<th>Time</th>
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| 09:00-09:15 | Molecular epidemiology of HIV-1 infection in Mongolia  
**Dr. Setsen Z, NCCD** |
| 09:15-09:30 | Assessment of laboratory diagnosis, treatment of syphilis and congenital syphilis and of health care providers' knowledge and satisfaction  
**Dr. Enkhtur Ya, MNUMS** |
| 09:30-09:40 | Field Epidemiology training programme development in China  
**Dr. Guoqing Shi, Director of FETP, China CDC, PRC** |
| 09:40-09:55 | In depth analysis of congenital syphilis cases for the last three years in Mongolia  
**Dr. Erdenetungalag E, NCCD** |

#### 09:00-09:30

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| 09:00-09:15 | Regional Measles Elimination in the Western Pacific: Progress, Challenges and New Strategies  
**Dr. Sodbayar D, WHO Mongolia** |
| 09:15-09:30 | Achievement and Challenges towards Measles and Rubella elimination in Japan  
**Dr. Tomimasa Sunagawa, Chief Infectious Disease Surveillance Center, NIID, Japan** |
| 09:30-09:40 | Experiences of New vaccine introduction in Mongolia  
**Dr. Nyamkhuu D, General Director, NCCD** |
| 09:40-09:55 | Real-time direct RT-LAMP method for the diagnosis of the respiratory tract viral infection  
**Dr. Mina Nakauchi, Influenza Virus Research Center, National Institute of Infectious Diseases, Japan** |

### Question & Answer

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<td>Results of detection Chlamydia, Mycoplasma, Urea plasma among STI Clients</td>
<td>Dr. Jugderjav B, NCCD</td>
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<td>10:10–10:30</td>
<td>Refreshment break</td>
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<td>10:30–10:45</td>
<td>HIV associated skin diseases in Mongolia</td>
<td>Dr. Narantsetseg V, MNUMS</td>
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<td>Parallel Session 4. Respiratory diseases</td>
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<td>• Dr. Ambaselmaa A, Director of surveillance and research department, NCCD</td>
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<td>• Dr. Woojin Lew, Senior Programme Coordinator, WHO</td>
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<td>Crystal Meeting Room</td>
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<td>Parallel Session 5. TB and Hepatitis</td>
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<td></td>
<td>• Dr. Buyanjargal Ya, Deputy Director, NCCD</td>
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<td>• Dr. Nick Walsh, Medical officer, WHO</td>
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<td>Topaz Meeting Room</td>
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<td>Parallel Session 6. WASH</td>
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<td>• Dr. Tsogtbaatar B, Director, PHI</td>
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<td>• Dr. Delgermaa V, Technical officer, WHO</td>
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<td>13:30–13:45</td>
<td>Serotyping results of pathogens of the IBDs, 2007-2016</td>
<td>Dr. Altantsetseg D, NCCD</td>
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<td>Factors Associated With Infant Measles Mortality in a Nationwide Measles</td>
<td>Dr. Baigalmaa J, NCCD</td>
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<td>Treatment outcome of hepatitis C in Mongolia</td>
<td>Dr. Saruul B, NCCD</td>
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<td>Water quality and safety of UB city</td>
<td>Mr. Batsukh B, Head of Technical Policy</td>
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<td>Department at WSSA</td>
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<td>14:00–14:10</td>
<td>Question &amp; Answer</td>
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<td>14:10-14:25</td>
<td>Influenza burden of disease Estimates in Mongolia during 2014/2015 season</td>
<td>Dr. Oyungerel D, NCCD</td>
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<td>Prevalence and risk factors for M.tuberculosis infection in 9137 Mongolian school children</td>
<td>Dr. Batbayar O, Dr. Badamtsetseg J, Mongolian Health Initiative</td>
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<td>Effects of prenatal exposure to PCB, dioxins and PFAAs on allergies and infectious diseases during infancy</td>
<td>Prof. Reiko Kishi, Head of Department of Public health, Hokkaido University, Japan</td>
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<td>14:25-14:40</td>
<td>Avian influenza surveillance in wild migratory birds of Mongolia in 2015-2016 by the Predict-2 project</td>
<td>Dr. Enkhtuvshin Sh, Wildlife Conservation Society</td>
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<td>The Analysis of Chest Radiology of the National Tuberculosis Prevalence Survey in Mongolia</td>
<td>Dr. Ichimura Yasunori, Chiba University Hospital, Japan</td>
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<td>Quality, safety and hygienic assessment of drinking water of urban population</td>
<td>Dr. Bayasgalan B, GASI</td>
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<td>14:40-14:55</td>
<td>Clinical profiles of both influenza and respiratory syncytial virus hospitalized cases in Baganuur district as a part of severe acute respiratory infection surveillance, 2015-2016</td>
<td>Dr. Taro Kamigaki, Department of Virology, Tokohu University, Japan</td>
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<td>Spread of TB among the Mongolian general population and their health seeking behavior</td>
<td>Dr. Tsolmon B, NCCD</td>
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<td>Auditing of water safety plan implementation</td>
<td>Dr. Erdenechimeg E, School of Public Health, MNUMS</td>
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**14:55-15:10**  **Question & Answer**

**15:10-15:30**  **Refreshment break**

**15:30-16:20**  **Forum:** Each session to discuss recommendations

**Closing: Summary, conclusions and further steps** (Sapphire conference hall)

**Moderators:**

*Dr. Enkhbold S, Director of Policy Implementation Coordination, MOH*

*Dr. Woojin Lew, Senior Programme Coordinator, WHO Mongolia*

**16:20-16:40**  **Recommendations of the conference**

*Working group*

*Dr. Narangerel D, Head of Emergency operating center, MOH*

**16:40-17:00**  **Closing remarks:**

*Dr. Soe Nyunt-U, WHO Representative in Mongolia*

*Dr. Ochirbat D, State Secretary, MOH*
Current situation of infectious disease and future steps

Tsogtsetseg A.,
Minister of Health

Preventing and fighting infectious diseases is one of the pressing public health issues and priority area of health sector. Comparison of average indicator of infectious diseases in the last 5 years (2011-2015) to indicators of 2006-2010 shows that intestinal infections have decreased by 14 percent, and sexually transmitted diseases, tuberculosis, zoonotic diseases rates have not declined. The rate of respiratory infections has increased by 17 percent and it is related to the outbreak of measles started from March 2015. That outbreak had 2 phases mostly affecting children under 1 year old and youth aged 18-30. As of 2015, sexually transmitted diseases account for 28 percent of total infectious diseases. Even though the HIV prevalence is low, it is mostly concentrated in the groups with high risk behaviour. Therefore a new approach is needed for surveillance of sexually transmitted diseases, tracing and early screening of sexual contacts, diagnosis and treatment.

Mongolia is implementing activities to prevent and combat infectious diseases in accordance with international health regulations and Asia Pacific Strategy for Emerging Diseases. For instance, the capacity of response and preparedness for infectious disease has built thanks to comprehensive actions like surveillance, early warning, response system of influenza and influenza-like illness, field epidemiology programme, network of emergency management units. However in the times when epidemics of Ebola, Zika and coronavirus are threatening the world, there are still many issues to improve concerning the intersectional collaboration, integrated digital information systems, research, emergency preparedness, quality and sufficiency of health care service etc. For that reason evidence-based, innovative approach is necessary for surveillance and monitoring of infectious diseases to implement urgently. In the near future, it is necessary to take measures to reflect health issues in policy and priority of all sectors, to provide health safety, to strengthen early detection, response and monitoring systems in cooperation of public, private and international organizations.
Global and regional priorities on prevention and control of infectious diseases

Mark Jacobs
WHO WPRO

Infectious diseases continue to be significant drivers of ill-health in the Western Pacific Region and globally. Key regional and global infectious disease priorities will be discussed, with priority being described using a number of different perspectives.

Moving towards universal health coverage in Mongolia through strengthening subnational health systems

World Health Organization, Mongolia

Background

Universal Health Coverage (UHC) — all people obtaining the health services they need without suffering financial hardship when paying for them—is one of the targets under the SDGs. It is also a platform for achieving other health-related SDGs. Advancing UHC will require strong health systems.

Results

Since 2012 WHO country office Mongolia has initiated subnational health system strengthening (SHSS) project involving national and international partners to address existing health challenges in the more decentralized legal and fiscal environment. WHO has been working as a lead development partner to implement sub-national health system strengthening strategy in Songinokhairkhan district and Umnugobi province since 2014. Other key partners such as UNICEF, World Vision and Norwegian Lutheran Mission are the lead in other districts and aimags to promote SHSS. SHSS is a platform that we introduce in other projects and programme activities. Subnational health systems strengthening is implemented also through implementation of RED strategy by delivering integrated package of health and social welfare services for hard to reach populations by using immunization services elements and engaging multi-sectoral coordination mechanism at all levels. Building on the strong national coordination mechanism, well-developed ICT, generic capacities
and lessons learnt from APSED implementation, Mongolia is strengthening local public health preparedness to fulfil IHR core capacity requirements. In 2015-2016 MoH established regional EOCs and laboratory network in aimags near national borders with support of WHO. Stakeholders across all sectors are building one standard system of real-time reporting, risk assessment and response that is connected to the regional and international levels. Health security and UHC are at the center of provincial HSS strategic plan. In the area of WASH WHO has provided support in development water safety plans and improving quality of drinking water. Integrated screening for non-communicable and communicable diseases has been implemented in selected khoroo of Songino-Khairkhan district and soums of Umnugovi province using mobile technology for diagnosis of NCDs and CDs at the primary health care and community levels. In addition, WHO is working with local health providers and Center for Health Development to properly document screening results into electronic database and to integrate it into national information system. Recently, WHO started series of training workshop on “Leaving no one behind” in the context of subnational health systems strengthening to build capacity of provincial and district health decision makers, officials from local governor’s office on how to plan, implement, monitor and evaluate programmes which are guided by principle “leaving non one behind”.

Conclusion

In order to address “unfinished agenda of communicable diseases” Mongolia health sector should work differently. Health in all policies should be promoted at all levels which will help to foster multisectoral collaboration. As reaching poorest, marginalized, vulnerable populations would be the most challenging in achieving UHC, “leaving no one behind” principle should be taken into account in planning, implementation, monitoring and evaluation of the priority public health programmes
Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III)

Anthony Eshofonie
WHO Regional Office for the Western Pacific, Manila, Philippines

For over a decade, the Asia Pacific Strategy for Emerging Disease (APSED) has served as a biregional framework for action in meeting the IHR (2005) core capacity requirements in the Asia Pacific region, and contributing to global health security. The third iteration of APSED, the Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III) has been submitted to the Sixty-seventh session of the World Health Organization Regional Committee Meeting for the Western Pacific for consideration of endorsement. The key implementers of APSED are Member States, WHO and partners. APSED III takes an all hazards approach and builds on the foundations of previous strategies, lessons learned from public health events and the results of a joint evaluation of ten years of APSED implementation. A series of informal technical consultations on specific focus areas, a mix of face-to-face and teleconference consultations with Member States, discussions with partners, and a high-level strategy review all helped contribute to the scope and content of the new document. APSED III emphasizes putting countries at the centre; a step-by-step approach; continuous learning for improvement; and the need to be forward looking.

APSED III has eight focus areas for implementation which includes: public health emergency preparedness (PHEP); surveillance, risk assessment and response, laboratories, zoonoses; prevention through health care; risk communication; regional preparedness and response; monitoring and evaluation. PHEP sits at the core of APSED III concentrating not only on the development of emergency plans but also highlights the importance of systems readiness which is a key aspect of sustainability and resilience. Flexibility has been built into APSED III so that it is not implemented in isolation but is able to align and harmonize with other frameworks and initiatives such as the Sustainable Development Goals, Universal Health Coverage, the Global Health Security Agenda and is also able to further collaborations on zoonoses using a One Health Approach.
Measles outbreak in Mongolia: lesson learnt and future measures

Baigal V.1, Gerelmaa D.1, Nyamaa G.1, Enkhtuya M.1, Altanchimeg S.1, Uranjargal Ch.1, Tselkhaasuren B.1, Narangerel D.2, Dolgorkhand A.2, Amarzaya S.2
1National Center for Communicable diseases, 2Ministry of Health, Mongolia

In Mongolia measles outbreak reported more than 20-times since 1958, the last major outbreak was in 2001. Mongolia was one of the 4 countries that received a measles-elimination certificate from the World Health Organization Regional Office for the Western Pacific in 2014. The current measles outbreak that was first detected in March 2015 in which mainly affected age groups of young adults and infants. There are 2 waves of this outbreak, 1st wave of outbreak peak was in May, 2015 and the 2nd peak of outbreak happened in February 2016, the same time which was influenza season. The measles outbreak was transmitted nationwide, highest attack rate occurred among the children under 1 year old and young adults 18-30 years old. Measles mortality was reported at peak during March - April 2016, exactly same when influenza illness at peak among infants. 74% of mortality occurred in infants under 9 months of age (which were not eligible for routine MCV vaccination). The measles outbreak response frame work, Mongolian government has been organized many activities with coordinating and collaborating government, non-government Organization, and international organizations with objectives of reaching target groups and to supporting local administrative community. The Mongolian government has conducted two times Supplementary immunization activities (SIAs) against measles among target age groups with 88-93.4% coverage’s. We have been conducted measles “Zero” dose among the children aged 6 months in capital city UB and 5 aimags with high population density, high birth rate and high measles incidences. Therefore, WHO and National Statistics Office of Mongolia has jointly prepared for the national survey to determine the measles immunity for the age group from 6 months to 35 year old population. We planned several response and activities against measles outbreak as organizing measles supplementary immunization activities among target age groups every 2-4 years, strengthen catch up immunization and building measles immunization system among new recruiting soldiers, secondary school entering children and students. We also planning to build stockpile and increase Vitamin A usage, improve infection prevention control measures and introduce web based immunization coverage software.
Programmatic outbreaks review of outbreak among school pupils in Ulaangom soum

Naranbat Ts.¹, Sodnom B.¹, Selenge Ts.², Tsend-Ayush D.³, Ariuntuya O.⁴
¹Department of Health, Uvs aimag,
²National Center for Communicable Diseases,
³General Agency for Specialized Investigation,
⁴WHO country office

Goal

The goal of the review was to assess early detection, monitoring and response capacities of existing system, identify areas that need further improvement and use the results in the planning.

Materials and methods

The review of the outbreak reported in Ulaangom school was conducted using questionnaire and facilitated discussion that involved 20 physicians and officers from Department of Health, Department of Inspection, Department of Emergency, Department of Education, Department of veterinary and breeding, aimag General Hospital, family center, school and kindergarten. According to the methodology review was conducted by principle of self-assessment which included areas such as capacities of surveillance, risk assessment, response, preparedness, laboratory, intersectoral collaboration, infection control, risk communication and monitoring and evaluation.

Results

The intersectoral committee established in 2013 was not fully functional. No coordinated surveillance and systematic risk assessment were in place in peace time among sectors. Health and other sectors collaborated during the outbreak and acute public health events. However, multisectoral response operations are not formalized and sectors provide joint response lead by Aimag emergency committee without clearly defined procedures. General hospital and veterinary laboratories collaborated during outbreak sharing required diagnostic kits and reagents. National laboratories played a significant role in the confirmation of the outbreak. Health and inspection laboratories with exception of veterinary laboratory had no formal accreditation. No regulation to conduct risk communication and its occurred information difference and affected public criticism.

Conclusions:

1. No coordinated surveillance and systematic risk assessment were in place in peace time
2. Health, veterinary, inspection and emergency management agencies collaborated effectively during the outbreak
3. No functional laboratory network operational at the aimag level; health and inspection laboratories were not accredited.
4. Staff are not trained on surveillance and risk assessment

Recommendations:
1. Develop and apply aimag intersectoral surveillance, preparedness and response procedure approved by the aimag Governor.
2. Conduct practical in-service training for aimag multisectoral rapid response team.
3. Strengthen laboratory capacity through cross-sectoral laboratory network.

Introduction of pneumococcal conjugate vaccine in Mongolia

Kim Mulholland
Murdoch Childrens Research Institute, Melbourne
London School of Hygiene and Tropical Medicine

Pneumonia is the leading cause of serious illness and death in children worldwide. While milder cases of acute respiratory infections are often caused by viruses such as Respiratory Syncytial Virus (RSV), most severe and fatal cases are caused by bacteria. *Streptococcus pneumoniae* (pneumococcus) is the leading bacterial cause. It is also the leading cause of non-epidemic bacterial meningitis in children. The new class of pneumococcal vaccines that is suitable for young infants is the pneumococcal conjugate vaccines (PCVs), the first of which was launched in 2000 in the USA. That vaccine (*Prevnar-7*) covered 7 or the 90+ serotypes of pneumococcus, while the PCVs currently available cover 10 (*Synflorix*) or 13 (*Prevnar-13*) of the serotypes, which are responsible for most cases of disease in children. While the PCVs are highly effective in preventing pneumococcal meningitis, it is unclear how effective they are at preventing pneumonia, as this is dependent on the fraction of pneumonia cases that are actually caused by the pneumococcus. PCVs have been implemented throughout the Americas, Europe and Africa, but few countries in Asia have introduced them, in part because of uncertainty about their effectiveness in preventing pneumonia. In Mongolia the Ministry of Health
has decided to introduce PCV into two districts of Ulaanbaatar, Sukhbaatar and Songinokhairkhan. NCCD, in collaboration with MCRI, Melbourne and WHO, has implemented surveillance for childhood pneumonia in those two districts, as well as Chingeltei and Bayanzurkh, in order to measure the impact of PCV introduction on the burden of pneumonia suffered by Mongolian children. This will provide a strong evidence base for the introduction of PCV into Mongolia, as well as providing a model for similar approaches in other countries.

Current status and challenges of water and sanitation facilities

Urantsetseg Sh.¹, Delgermaa V.²
¹Ministry of Health, Mongolia, ²WHO

Health sector’s role and leadership with the focus of environmental health was essential for endorsing amended over 10 environmental laws which are consistent with the State Policy on Public Health approved in 2001 by the Mongolian Parliament resolution No81, the Health sector Master Plan approved by the Government resoultion No72 in 2005, and the Mongolian MDGs approved in 2008 by the parliament resoultion No12. One of major reasons attributing to incidences of communicable diseases among children is exceeding number of pupils in a classroom in educational facilities such as schools, kindergartens and dormitories, not well designed and properly operated rest rooms, high number of kids per sink and toilet. Hence, in order to provide healthy learning and living environment for pupils, teachers, and workers and promote their health and healthy behaviors to learn, the Ministers for Education, Culture and Sciences, Health and Sports, and Finance have approved the joint order A/253/521/173 in 2015 for implementing “Hygienic requirements and norms for water, sanitation and hygiene in schools, kindergartens, and dormitories”. Multi-sectoral 6 working groups have been established by a Joint Order of the Minister of Nature, Environment and Tourism and the Minister of Health No. 32/A-28 of 2011 in order to implement Bangkok, Jeju, Kuala Lumpur declarations of the regional forums on Environment and Health in Southeast and East Asian Countries jointly supported by WHO and UNEP. The composition of the working groups has been renewed and 129 members of the working groups have been approved by the Joint Order of Minister of Nature, Environment and Green Development and the Minister of Health and Sports No. 126/A-134 of 2014. The working group on WASH which is one of
these six working groups had discussed over 10 issues through its 4 meetings in 2015.

In Mongolia “Water safety plan” programme has been implementing since 2012 with the support of WHO and MOH. The Water Supply and Sewerage Authority of Ulaanbaatar City, and the Water supply company of Dornogobi aimag are pilot model entities of this implementation. During the programme implementation a total of 7 series of trainings have been organized for over 800 participants and as result of the training 74 national trainers and 20 national consultants were prepared. The MOH has renewed the Mongolian national standard of technical requirements for open pit latrine and sewage pit in 2014 in order to foster healthy living environment for communities, protect environment and prevent from infectious diseases and the renewed standard was enforced in 2016 particularly with focus on health care facilities. Further effective actions are needed in strengthening health surveillance system, improving legal environment of conducting health impact assessments, scaling-up water safety plan for urban settings and small communities, upgrading water and sanitation hygiene condition health care facilities, and integrating collaboration and cooperation of governmental, non-governmental and international organizations.

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Economic impact on HCV treatment in Mongolia and other countries of Western Pacific Region of WHO

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The Regional Action Plan contains a number of milestones and targets arranged by priority areas for action. One of the important milestones is to obtain baseline data for national hepatitis screening, care and treatment cascade by 2017 to support 28 million people being diagnosed and 5 million treated for hepatitis B, and 5 million people being diagnosed and 1 million people treated for hepatitis C. In the absence of external funding mechanisms, domestic financing strategies are key to achieving these goals. WHO undertook a sequential approach from epidemiological estimates to budget impact and financing options in Mongolia and is replicating this in several other countries in the Western Pacific Region. The seven-step process is 1) disease burden estimation; 2) population-level intervention scenarios; 3) cost estimation; 4)
cost-effectiveness analysis; 5) budget impact analysis; 6) financing strategies (across individuals, health insurance and the government); and 7) cost-sensitivity analysis. The agreed population-level intervention scenario was five years of treating those with advanced liver disease, followed by 10 years of unrestricted treatment to reach 2030 elimination goals. Cost estimation revealed that the total cost of antiviral medicines over the 15-year period would be large—a key driver of overall cost. Lower drug prices (generics vs originator) would increase the return on investment to society from 2.5 times to 5 times over the 15-year period. Diagnostic costs would be reduced by adhering to new WHO hepatitis C treatment guidance, which requires only two viral loads per treatment course. Analysis predicted a cost spike in the mid-2020s, when a reduced pool of infected individuals would increase the costs for finding new diagnoses, indicating that testing strategies would have to be modified as the epidemic is progressively addressed. Cost-effectiveness analysis revealed that cost over the 15-year period to 2030 would be less than 5% of gross domestic product (GDP)/per capita/disability-adjusted life year (DALY) averted—therefore, highly cost effective. Dr Walsh will present updated results for Mongolia and key high hepatitis burden countries in the Region.

Finding of the first national TB prevalence survey in Mongolia, 2014–2015

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Background

Tuberculosis (TB) is a major public health concern in Mongolia. The World Health Organization (WHO) estimated prevalence rate of all form TB was 254 per 100,000 populations in 2013. The WHO is recommending to carry out TB prevalence survey for countries which have higher prevalence of infectious TB cases among the population (higher than 100 per 100000 population) and with comparable lower rate of TB detection below 100%. As of 2010, the TB detection rate was 74.8% and estimated prevalence of infectious TB cases was 144.3 per 100000 population in Mongolia.
Goal

The goal of the survey was to estimate the burden of disease caused by TB among the population of Mongolia and to identify ways to improve the implementation of the national tuberculosis control programme.

Materials and methods

A population based, cross-sectional survey was conducted using stratified cluster sampling. Participants were screened by interview and chest X-ray examination. Participants with a cough lasting two weeks or longer and/or abnormal chest X-ray were classified as suspected TB cases and sputum samples were collected and diagnosis confirmed by using smear and culture tests.

Results

Of 60,031 eligible subjects, 50,309 participated in the survey. A total of 88 smear-positive cases and 160 smear-negative, culture-positive TB cases were identified. The weighted prevalence rates of smear-positive and bacteriologically-positive tuberculosis were 204 (95% CI:143-265) and 560 (95% CI:455-665) per 100,000 population aged above 15 years, respectively. Tuberculosis prevalence was higher in men than women and increased with age.

Conclusions:

The prevalence rate was much higher than the WHO estimation based on routine surveillance data. The survey raised challenges for strengthening TB control in Mongolia by focusing on cases without symptoms and the elderly population.
STREAM clinical trial: Improving patient care and management of MDR-TB

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WHO estimate that there are over 500,000 new cases of MDR-TB each year, but only one in five are treated (success rate < 50%). Although a minimum treatment duration of 20-months is recommended by WHO for MDR-TB, it is a conditional recommendation that is not based on evidence from clinical trials. However, a promising 9-month treatment\textsuperscript{1} for MDR-TB with relapse-free cure of approximately 85% is being tested by STREAM. STREAM is an international, multi-centre, parallel-group, randomised controlled trial with the aim of assessing the efficacy and safety of the shortened (6-9 months) regimens. This is the first ever clinical trial carried out in Mongolia. In Stage-1 of the trial, eligible patients are randomly allocated to receive either the 9-month or the locally-used WHO standardised treatment. Stage-2 includes two additional regimens and both will be compared to the 9-month regimen in Stage-1. In both of these regimens a newly developed drug, bedaquiline, is included. In the first of the new regimens, total treatment duration is reduced to 6-months. The second of the new regimens is an all oral 9-month regimen. Trial medications are repacked into daily and weekly doses with sufficient information provided on the labels. As all patients will be followed up to 33-months post-randomisation, site staff have developed a retention strategy to avoid withdrawals, loss to follow up and ensure treatment completion. During treatment, patients are supervised closely (Directly Observed Treatment-DOT) not only by trained health staff, but also by engaged DOT volunteers, family practitioners and patients’ family members. Patient and family meetings, whilst patients are still hospitalized, have proven to be very successful in creating close communications with them and to convey information about MDR-TB, side effects of medications and importance of treatment completion and follow up. The patients’ safety are closely monitored by frequent clinic visits, blood, urine, smear, culture tests and other investigations, including triplicate ECG recordings. Such site specific strategies that combine flexible collaboration of staff with the patients and their close family, incentives in the form of food support, transportation cost improves the patients’ care greatly.
Results of detecting and identifying of human Papillomavirus and other causative agents of sexually transmitted infections using nucleic acid based flow-through hybridization microarray method in genital tract samples

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Introduction

In the last two decades, rate of STI has been increasing steadily among the registrable infectious diseases in Mongolia. Therefore, it is important to implement preventative screening and diagnostic plan utilizing innovative technology as most prevalent STI worldwide such as HPV, HHSV, ureaplasma, mycoplasma infection not diagnosed properly in Mongolia.

Goal

To detect and identify STI pathogens and their circulation among population in Ulaanbaatar, Mongolia using nucleic acid based multiplex microarray assay.

Materials and methods

The study was conducted with cooperation among NCCD, NCC and Gyals Medical Center LLC in 2013-2014. The study population was composed of 5 groups. Total of 1473 cervical and urethra swab samples were collected, of which 1228 from NCCD, and 245 from NCC. Samples were analyzed at “Gyals” clinical center using GenoFlow-STD Array and GeneFlow-HPV Array, DiagCor, HK test kits based on Flow-throw hybridization method. We analyzed using the method to test for HPV 6/11 utilizing a detection kit that tests for following 12 pathogens.

Results

19.7% (284/1441) of all samples tested positive for N.gonorreae 19.1% (282/1473), C.trachomatis 11.4% (169/1473), T.vaginalis 8.6% (127/1473), M.genitalium 7.4% (46/1473), T.pallidum 0.8% (13/1473), and other conditional STI’s: U.urealyticum/U.parvum, M.hominis were 43.9% (648/1473) and 26.5% (391/1473) positive, and 0.6% (10/1473) tested positive for HSV 1/2. Overall, 35.9% (308/859) of all women tested were positive for HPV.

Conclusions:

Nucleic acid based assay that employs flow-through hybridization micro-array method allows detection and identification of viral pathogens (HSV, HPV) and some pathogens (CT, MH/MG, UU/UP) which is not sufficient to detect by traditional method.
Human Papillomavirus vaccination experiences in Australia

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Australia leads the world in the speed and breadth of implementation of its quadrivalent human papillomavirus (HPV) vaccination programme. The programme began with schoolgirls and young women in 2007, and was the first to offer free vaccination to schoolboys from 2013. Decades from now the vaccination programme should result in dramatic declines in HPV-related anogenital and oropharyngeal cancers. In the meantime, the impact of the vaccination programme can be evaluated through measuring its population coverage; monitoring for adverse events; determining effects on HPV prevalence; and surveillance of short- to medium-term HPV-related morbidity such as genital warts, recurrent respiratory papillomatosis, and precancerous lesions. This presentation will review how the vaccination programme has been evaluated and summarise the (exciting) findings to date.

Review of microbiology laboratory capacity and skills

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Laboratories operating in the area of infectious disease diagnosis and food hygiene in Mongolia accredited with MNS ISO/IEC 15189:2008, MNS ISO/IEC 17025:2007. Veterinary and inspection laboratories have started accreditation since the end of 1990 and health laboratories started accreditation process actively in the last 3 years. Institute of Veterinary Medicine has MNS ISO/IEC 17043:2007 that specifies technical requirement microbiology, parasitology, immunology, pathology fields: confirmation, evaluation of the performance of laboratories for specific tests or measurements and monitoring laboratories’ continuing performance, identification of problems in laboratories and initiation of actions for improvement, establishment of the effectiveness and comparability of test or measurement methods; training and provision of additional confidence to laboratory customers. The microbiology laboratory review was carried out within the MNS ISO/IEC 17043:2007 using WHO and OIE laboratory assessment tools and core indicators. Results of multisectoral laboratory review reveal inadequate infrastructure, specimen transportation
system and laboratory skills of staff, lack of laboratory training, inadequate AMR testing, confirmation and surveillance. The establishment of cross-sectoral laboratory networking, coordination, training and laboratory accreditation are critical to improve laboratory capacity.

The burden of cancers attributable to infections: Worldwide and in Mongolia

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By the estimation of the researchers (M.Plammer et al, 2016) from the WHO IARC, Lion, 2.2 million (15.4%) of all registered worldwide in 2012 cancer cases (~14 millions) belong to the cancers attributable to infectious agents. The share of cancer cases attributable to infectious agents were diverse in different countries, however, the share in Mongolia was over 50%, one of the highest among studied countries. The following 10 agents: Helicobacter pylori, hepatitis B virus (HBV), hepatitis C virus (HCV), some types of human papilloma virus (HPV), Epstein-Barr вирус (EBV), Human herpes virus type 8 (HHV-8), хүний Т-лимфотроп вирусиийн нэгдүгээр хэвшинж (HTLV-1), Opisthorchis viverrini, Clonorchis sinensis, Schistosoma haematolobium were classified by IARC as the infectious agents leading to the human cancers. In this lecture the current situation of cancers attributable to infectious agents worldwide and in Mongolia with their epidemiology, cancergenesis and control measures will be given.
Molecular Epidemiology of HIV-1 in Mongolia

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Objective

By the end of 2015, totally 199 cases were diagnosed with HIV and among them 159 (79.8%) were male including 126 (79.2% of males) men who have sex with men (MSM). More than one third of all cases (36.2%) were identified between 2013 and 2015. Davaalkham et al. (2010) reported that HIV-1 spread during a relatively short period with same ancestor virus especially among MSM. They also indicated that the outbreak might started around early 2000s. This evidence has suggested that the treatment as prevention intervention (TaP) of antiretroviral therapy (ART) could be very effective for them. Since 2013 every MSM who was diagnosed with HIV has been offered to receive ART without CD4+ cell count and/or clinical eligibilities in Mongolia. To provide evidence on efficacy of TaP in Mongolia, it is beneficial to continually investigate the molecular epidemiology of HIV-1.

Materials and methods

Samples were collected from HIV-1 infected individuals diagnosed between 2013 and 2015. HIV-1 RNA was extracted from plasma, amplified HIV-1 pol and env region by RT-PCR and nested PCR. Genes were sequenced by direct sequencing.

Results

Sequences of pol region were obtained from 54 samples. Dominant subtype was subtype B, 43 (79.6%), followed by CRF02_AG, 7 (13%). For env region, 53 samples were analyzed and the result showed that dominant was subtype B, 29 (54.7%), followed by subtype CRF01_AE, 14 (26.4%). Interestingly, we found that 12 samples were subtype B for pol region but then CRF01_AE for env region, and one sample was subtype C for pol region and then CRF01_AE for env region.
Discussion

Previously identified cluster indicating remarkable expansion of same ancestor virus among MSM was not observed in our investigation. It is considered to be TaP is being effectively implemented in Mongolia. Further investigation is required to determine full sequence of those HIV-1 recombinants.

Report of the Project on “Assessment on Capacity of Diagnostics, Treatment and Human Resources of Syphilis and Congenital Syphilis”

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Background

The prevalence of sexually transmitted infections (STI) nationwide have been persistently staying the same with the increase in the rates of syphilis. According to health statistics of 2014, 15,300 cases of STIs were reported in that year making up 45.6% among all reported communicable diseases and increased by 0.9 per 10’000 population compared to the previous year. Out of total reported STI cases 45.0% was syphilis. In 2014, 6890 new cases of syphilis were reported and the rate per 10’000 population was 23.5. Therefore, assessment on syphilis and congenital syphilis diagnosis processes, treatment and human resource capacity was conducted. The assessment was supported by the Global Fund and the Ministry of Health.

Goal

To assess diagnosis, treatment and human resource capacity for managing syphilis and congenital syphilis

Materials and methods

Sample size (number of primary health facilities) was determined to be sufficient to capture changes in the capacity (when significance is 5%, the power is >80%). At the secondary level we have chosen the sample to represent all regions territorially which covered 8 urban and 7 rural health facilities. So the total sample included 89 primary level facilities from 7 aimags, UB city, Darkhan-Uul and Orkhon aimags, 15 secondary level facilities and 5 tertiary level facilities.
Results

The research findings presented three components including results about diagnosis, treatment and human resources carried out by 3 teams.

**Diagnostic team:** The assessment covered 87 laboratories and found that 75.9% had sufficient reagents to carry out syphilis diagnosis. 25-30% of the laboratories had stock out of syphilis diagnostic kits. 79.4% did not have records on inspection of the transportation conditions when receiving the syphilis kits, 77.1% did not have records on checking the storage conditions of the kits at the facility. The knowledge checking test was given to 20 laboratory doctors and 40% received insufficient scores, the average correct response to the test with 35 questions was 15.05±-4.39.

**Treatment team:** The knowledge of family and soum doctors on management of syphilis and congenital syphilis was low (42.7±3.7%). The knowledge of soum and family nurses was moderate (76.6±1.8%). The knowledge of antenatal care doctors of aimag general hospitals (AGH) and district health complexes (DHC) was 53.1±4.3%. Knowledge of 13 doctors from delivery wards covered by the survey was 43.1±5.5%.

**Human resources team:** The shortage of STI doctors in rural areas was 34.9%, in Ulaanbaatar city 12.5%. The doctors and medical professionals covered in the survey worked on average for the public sector for 15.5 years and in that specialization for 9.2 years. 49.1% of doctors and 67.7% of midwives, 27.8% of laboratory staff, and 53.2% of nurses covered by the survey attend trainings regularly.

Conclusions

Appropriate conditions for laboratory diagnosis and confirmation of syphilis are not met at the primary level health facilities, the reliability and efficacy of the tests are not ensured. Doctors working at all levels of the health system do not have sufficient knowledge about syphilis and congenital syphilis.
Congenital syphilis in the last three years in Mongolia

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Background

Laboratory confirmed new cases of syphilis, gonorrhea, trichomoniasis and HIV infection are reported as sexual transmitted infections in Mongolia. In 2015, STIs accounted for 28 percent of all reported infectious diseases. Syphilis prevalence per 10,000 population has increased from 8.5 in 2005 to 25.7 in 2015. In addition, the increase of congenital syphilis incidence brings considerable public health concern.

Goal

To present descriptive analysis for reported cases of congenital syphilis from 2014 to 2016 in Mongolia.

Material and methods

A total of 111 congenital syphilis cases were confirmed and reported at AIDS/STI Surveillance and Research Department of NCCD from January 1st of 2014 to August 31st of 2016. A retrospective analysis was performed on those cases.

Result

In the selected period, a total of 111 congenital syphilis cases were reported from Ulaanbaatar city and 16 provinces in Mongolia. Nationwide the congenital syphilis incidence rate was 0.37 (n=30) per 1,000 live births in 2014, 0.64 (n=52) in 2015 and 0.55 (n=29) on August 2016 respectively.

The provinces with the highest congenital syphilis incidence rates per 1,000 live births were Dornogovi, Dornod, Dundgovi and Orkhon provinces in 2014, Bulgan province in 2015 and Bayan-Ulgii, Orkhon, Umnugovi and Tuv provinces in 2016. 84.5 percent (93/111) of mothers were aged between 20-34 years and 73% (81/111) were married. 64.9 percent (72/111) received antenatal care (ANC), 65.3% (47/72) were screened for syphilis and 38.3% (18/47) were screened twice for syphilis during their pregnancy. Data collected in 2016 provided additional demographics, of which 86.2% (25/29) had elementary and middle education and 79.3% (23/29) were unemployed.
Conclusions

There is a tendency for further increases in the congenital syphilis incidence rate in Mongolia, particularly if mothers do not receive ANC, there is inadequate ANC care and if pregnant women are not screened for syphilis.

Detection of Urogenital Chlamydial, Mycoplasmal and Ureaplasmal Infections among STI Clinic Attendees in Ulaanbaatar, Mongolia

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Background

Only four sexually transmitted infections such as syphilis, gonorrhea, trichomoniasis and HIV/AIDS are officially reported in Mongolia. The spread and distribution of chlamydial, mycoplasmal and ureaplasmal infections known to be the major STI pathogens in other parts of the world are unknown.

Goal

To determine the prevalence of urogenital chlamydial, mycoplasmal and ureaplasmal infections among STI clinic attendees.

Objectives

To detect and compare clinical manifestations of urogenital chlamydial, mycoplasmal and ureaplasmal infections occurring either as a single or as a co-infection with other STIs.

Material and methods

A total of 1,196 urogenital specimens were collected from symptomatic and asymptomatic men and women attending outpatient STI clinic of the HIV/STI Surveillance and Research Department at the National Center for Communicable Diseases in Ulaanbaatar, Mongolia between 2014-2015. Multiplex GenoFlow Micro-Array Test Kit [FT-PRO], DiagCor methods were used for detection of chlamydial, mycoplasmal and ureaplasmal agents.
Results

*C. trachomatis*, the causal agent of urogenital chlamydial infection was detected in 13.5% (162/1196), *M. genitalium* in 3.5% (42/1196), *M. hominis* in 27.9% (334/1196), and *U. urealyticum/U. parvum* in 43.6% (522/1196) of study participants. Among specimens positive for single pathogen *C. trachomatis* was found in 24% (37/162), *M. genitalium* in 10.9% (4/42), *U. urealyticum/U. parvum* in 42.1% (220/522), and *M. hominis* in 19.1% (64/334). Eleven percent (33/301) of asymptomatic women tested positive for *C. trachomatis*. At the same time, about 6% to 36% of asymptomatic women had clinical signs of urogenital inflammation such as cervical and vaginal erosions, ulcerations and abnormal discharge. Although 12.7% (40/315) of asymptomatic men tested positive for *C. trachomatis*, signs of urogenital inflammation including urethral discharge, redness, and swelling of the tip of urethra were found in only 3% of them. Above clinical signs were observed in 6.6% to 53% of asymptomatic women positive for *M. hominis* or *U. urealyticum/U. parvum* alone. No changes were found on clinical exam among asymptomatic men positive for *M. hominis* only while evidence of abnormal urethral discharge was found in 3.1% of asymptomatic male outpatients positive for *U. urealyticum/U. parvum* only.

Conclusions:

1. High prevalence of chlamydial and ureaplasmal infections was found among the attendees of the major STI clinic in Ulaanbaatar, Mongolia.
2. Most *C. trachomatis, M. genitalium, M. hominis, and U. urealyticum/ U. parvum* infections (57.9% to 89.1%) occurred as co-infection.
3. Up to 53% of women positive for *M. hominis* alone and *U. urealyticum/U. parvum* alone had signs of urogenital inflammations on clinical exam.
4. Results indicate that these pathogens have the potential to cause inflammation in a urogenital tract of men and women.
HIV associated cutaneous condition in Mongolian patients

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Background
Since the very first case of HIV diagnosis in 1992, there are totally 218 cases have been identified by September 2016. It was only few cases reported per year until 2005, however, the number rapidly increased since 2005. Mongolia is now considered as a country with concentrated HIV epidemic with HIV prevalence of 12% among a risk group. For people with HIV infection, when their CD4 cell count falls down, they may present with many symptoms of more than one disease. For instance, in 90-95% of them skin diseases develop, for example, it is already known that when CD4 <200 mm\(^3\) Kaposi sarcoma, CD4>200 mm\(^3\) condyloma might develop. There has been no study conducted to investigate the characteristics of skin diseases among people living with HIV in Mongolia.

Objective
To investigate the characteristics of skin diseases among people living with HIV in Mongolia.

Materials and methods
We retrospectively analyzed data of 192 Mongolian patients with HIV, AIDS. /Retrospective clinical case series/

Results
Totally, there were 192 cases with HIV, AIDS and out of which 81,2% [n=156] were males, 18,8% [n=36] were female. Mean age of patients was 32,7±8.8. There were totally 602 events of any symptom occurrences with frequency of 1-13 times in one patient and 41,9% of them were related to skin diseases. Among them, 31,1% [n=187] presented only 1 disease, 7,8% [n=47] presented 2, 2,3% [n=14] presented 3, 0,7% [n=4] presented 4 co-morbidities. CD4 cell count was above 500 cells/mm\(^3\) in 33.9% of those who presented with dermatitis and 45,3% of those who presented with HSV infection (p<0,001).

Conclusions
CD4 cell count is relatively higher among patients with dermatitis and relatively lower among patients with fungal diseases.
Coverage of antenatal syphilis screening and predictors for not being screened in Ulaanbaatar

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Objectives

To measure the coverage of antenatal syphilis screening and identify factors related to women not being screened.

Goal

To assess the syphilis control programme in Mongolia.

Materials and methods

Antenatal care records of women in 30 antenatal care clinics of 6 districts were reviewed. Additionally, postpartum women were interviewed to identify potential factors for not being screened.

Results

Among 321 antenatal records, the coverage of syphilis screening was 83.9%. The proportion of pregnant women for syphilis testing initial enrollment in the survey (92), but the re-enrollment rate (72) is not enough. Being unscreened was significantly associated with late antenatal care (odds ratio OR=2.6), lack of knowledge (OR=5.5), history of previous sexually transmitted infection (OR=3.7), and living far from screening services (OR=4.9). 19.2% of pregnant women do not know whether to give tests for syphilis and not been given 43.4% and 72.7% do not know when to keep.

Conclusions:

The coverage of antenatal syphilis screening is still low, with poor contact tracing. More efforts are needed to promote early antenatal care visit and improve syphilis screening systems.
Study of medical care services for people living with HIV/AIDS

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Background

Many study reports are available on HIV prevalence, but no studies have previously been conducted on specialized medical services for people living with HIV (PLHIV) and knowledge of HIV prevention among health care workers.

Objectives

To study medical care services for PLHIV and to evaluate knowledge on HIV prevention among health care workers.

Materials and methods

Time-location sampling was used to randomly recruit 40 PLHIV and 213 health care workers from 9 randomly selected specialized hospital centers, public hospitals and maternity centers. A questionnaire was used to collect data from all participants. The health care worker target groups for the study were surgeons, nurses, obstetricians and midwives. In addition to the questionnaire, private interviews with 15 PLHIV participants were separately conducted for qualitative analysis.

Results

67.5 percent of PLHIV responded it was difficult to attend hospitals, of which 92.6% confirmed they received medical services without disclosing their HIV infection status. PLHIV faced difficulties when receiving medical services and the number of years after diagnosis was a statistically significant factor (p=0.01). Health care workers who scored higher on knowledge of HIV prevention were more likely to deliver medical services for PLHIV (p=0.0001). When evaluating HIV prevention knowledge among health care workers, knowledge on the guidelines for blood borne infection prevention, post-exposure interventions and HIV PEP kit were directly correlated (p=0.021).

Conclusions

1. Specialized medical service delivery for PLHIV is concentrated at NCCD due to discrimination towards HIV status in broader health care settings. This situation negatively affects the quality and access to required medical services for PLHIV.
2. Inadequate knowledge of HIV prevention among health professionals, lack of medical protective clothing/equipment and poor infection control to prevent HIV infection in health care facilities are the main factors that put health professionals at risk of acquiring HIV infection in their work place.

Evaluation result of HIV/AIDS and TB co-infection treatment technology

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Background

As of 2014, in Mongolia there were 24 people passed away out of total 181 registered cases of HIV/AIDS infection. 6 people passed away out of 31 registered cases of HIV and TB co-infection and 1 person developed multidrug-resistant TB. Mongolia is considered one of the countries having high risk of HIV spread and increasing rate of Sexually Transmitted Diseases (STDs). Besides that, Mongolia is one of the countries with highest rate of TB prevalence and mortality among 37 countries of WHO Western Pacific Region. It is required to analyze current situation of HIV and TB co-infection treatment technology and to improve emergency and health service in the future.

Goal

The purpose of the evaluation is to evaluate current situation of HIV and TB co-infection treatment technology in effect in Mongolia.

Materials and methods

A retrospective, descriptive method is applied to the performance evaluation of the treatment technology of HIV/AIDS and TB co-infection cases registered in Mongolia. This evaluation used information on registry, treatment and check-up sheets, surveillance data and lab registry of 180 registered cases of HIV diagnosed in 1992-2014.

15 health institutions implementing the co-infection diagnoses and treatment technology were selected for the survey using a targeted sampling method.
Results

If diagnosed with HIV and TB co-infection, it is required to begin antiretroviral therapy (ART) regardless of number of CD4 cell. However, 77% (24) of total cases has began the ART. Average time to begin the ART after confirmation of HIV infection is 662 days (1.7 years). 5 (71.4%) out of 7 cases failed to begin the ART passed away. 84.6% of the cases under TB treatment, took 1st-line treatment drug for TB and 92.3% were treated at TB dispensary of corresponding province or district. 80.8% out of them successfully recovered, 11.5% defaulted the treatment and 7.7% died. Cases with HIV and TB co-infection are completely treated for TB. However, discontinuity and mortality rates are considerably high compared to the treatment result of the cases with no HIV infection.

Conclusions

Rate of the ART is low for patients with HIV and TB co-infection. According to TB treatment result of cases with HIV and TB co-infection, defaulted and mortality rates are high.

Evaluation result of HIV/AIDS and TB co-infection diagnosis technology

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Background

Mongolia is considered one of the countries having high risk of HIV spread due its increasing Sexually Transmitted Diseases (STDs) rate, low condom use rate among general population and risk group and its location in the region with rapid spread of HIV. Besides that, Mongolia is one of the countries with highest rate of TB prevalence and mortality among 37 countries of WHO Western Pacific Region. As of 2014, in Mongolia there were 24 people passed away out of total 181 registered cases of HIV/AIDS infection and 6 people out of 31 registered cases of HIV and TB co-infection and 1 person developed multidrug-resistant TB.
Goal

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Materials and methods

A retrospective, descriptive method is applied to the performance evaluation of the diagnosis technology of HIV/AIDS and TB co-infection cases registered in Mongolia. This evaluation used information on registry, treatment and check-up sheets, surveillance data and lab registry of 180 registered cases of HIV diagnosed in 1992-2014.

Results

31 out of 181 cases of HIV infection registered in 1992-2014, co-infected with TB (31/180 or 17.2%) and of whom, 10 (32.3%) infected with HIV after TB was diagnosed and 21 (67.7%) infected with TB after HIV was diagnosed. Percentage of nationwide registered cases of TB, who HIV tested and aware of their HIV-infection increased lately and reached 89.8%, as of 2014. All HIV infected cases 100% took a chest X-ray, regardless of their infection status. However, 70% of cases with coughing, 65% of cases with fever, 56% of cases with weight loss and 56% of cases with sweating, took a bacterial infection test of phlegm. Cases evaluated after HIV infection is confirmed, took the chest X-ray test, in average, 1.2 times per year.

Conclusions

Lately, number of people who took an HIV test when new or treated TB cases diagnosed is increasing regularly, however, people still fail to re-take the HIV test during TB treatment and monitoring under instruction.

Syphilis among prisoners

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Background

There is low information about sexually transmitted infection, prevention, treatment and care in prisoners. So we aimed to document situation of sexually transmitted infections among prisoners.
Materials and methods

We conducted cross sectional study that included 3143 prisoners in 12 prisons to detect syphilis infection using TPHA and RPR tests with identification of titer. We used MS Excel, SPSS 20 and Open-Epi programmes in the analysis.

Results

Overall syphilis infection rate among prisoners was 14.2% with new infection rate 6.7%. Of 187 new syphilis cases, median age was 34.8 (±10.2) years and 90.2% was male and 9.8% was female. Syphilis infection rate in females was 10.4% (95%CI: 7.2-14.5) and in males 5.5% (95%CI: 4.6-6.4).

Conclusions

Detect and provide treatment of STI including syphilis when prisoners first moved in. Conduct regular testing of STIs among prisoners and peer-training activities on STI prevention is important in prevention of STIs among prisoners.

Result for CD4+ T-lymphocytes cell counts in patients with human immunodeficiency virus, changes to viral load, opportunist and co-infection

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Background

Therapy of HIV. HIV cases in Pacific regions have reached 1.1-1.7 millions. 400 of them (24-40%) are under retrovirus therapy. By the order №197 of Minister of Health on August 31, 2004, if CD4 cell counts 200c/mm³, order №429 of Minister of Health on December 10, 2009, if CD4 cell counts 350c/mm³, the order №278 of Minister of Health on August 20, 2014, if CD4 cell counts 500c/mm³ /according to the WHO revised recommendations/, ARV shall begin as well as risk groups shall be treated in Mongolia.

HIV/ AIDS opportunistic infection and co-infection. During HIV/ AIDS periods, virus counts is booming in T-helper (Tₜ) or CD4 cells while immune cells is decreasing. Furthermore body is not able to protect from virus itself,
and causes tuberculosis, fungal, cancer, Pneumocystis Carinii (PCP), herpes, lymphadenitis, and zoster. PCP is special pneumonia of HIV/AIDS patient. During 3-4 stages of PCP, CD4 cells has reached<200. Determination of CD4 cell counts after and before the treatment of HIV, estimation of treatment result and less researches on opportunist and coinfection are the basis of this research.

**Goal**

To investigate opportunist and coinfection and CD4 cell counts in ARV treatment for HIV positive patients registering between 1992-2015.

**Objectives**

1. To compare CD4 cell counts, virus nucleotides counts of HIV positive patients after and before the treatment, and estimate treatment result
2. To investigate opportunist and coinfection of HIV positive patients.

**Ethics:** Research has carried out after signing in confidentiality agreement with the permission of NCCD, AIDS/STD Surveillance Department chairs, doctors.

**Material and methods**

The research has carried out using the structure of cross sectional research, with the information of HIV positive patients registered in AIDS/STD Surveillance between 1992-2015. The information is updated until 30 June, 2015.

**Results**

Off the participants, 61.3% (n=84) had received ART regularly and the rest of 38.7% (n=53) had irregular intake of ART. Although there is small change in CD4 cells between the regular and irregular intake of of ART for 1-3 years, change observed in CD4 counts between regular and irregular intake for 3.1-6 years was 1-7.8 times. Viral load of participants (n=117) before ART was 0-20 million cps/ml, which had reduced at 1-6 years of start by 2.6-16.5 times in group who had ART for 10 months and three years and the observation was statistically significant (<0.05). Of all participants (n=186), 38.2% (n=71) had opportunistic infection, which most (49.3%) of them were TB, 35.2% were herpes infection and 27% were fungal infection. Syphilis, HPV and Hepatitis virus infection were diagnosed in patients. Of all patients, 58.8% (n=110) had co-infection, among which comprised of syphilis (62.6%) and 57.3% were viral hepatitis.
Conclusions:
1. CD4 count has increased after ART intake compared with pre ART by 1.5-2.1 times (p-0.001), viral load had decreased by 2.6-16.5 times after 10 months and 3 years long antiviral drug (p-0.00).
2. 38% of HIV/AIDS patients had opportunistic infection and 59% had regular intake of ART. Among the co-infection, TB and syphilis were most prevalent in patients.

Role of signaling molecules on human mast cell activation during Trichomoniasis

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Background

*Trichomonas vaginalis* is known to be a sexually transmitted protozoan parasite. *Trichomonas vaginalis*-derived secretory products contain various protein, carbohydrate pathogenic mediators and lipid mediator LTB₄. Tissue-residing mast cells are reported to be major players in the mucosal inflammatory response to allergy and infection with parasite. Im SJ et al (2011) determined that mast cells release various granular proteins and mediators such as histamine, TNF-α for tissue inflammation during infection with *T.vaginalis*, but what signaling molecules involved in this processes unknown until now. Mitogen activated protein kinase (MAPK) activated by various stimuli also regulate the transcriptional activity of various cytokine genes in the mast cells. Because of their essential role in intracellular signaling network, also appropriate targets for pharmacological treatment of inflammatory disorders. Mast cells can activate by various receptors with parasite infection.

Goal

Role of signaling molecules on human mast cell activation induced by *Trichomonas vaginalis*-derived secretory products (TvSP).
Materials and Methods

Cultivation of *T. vaginalis* and HMC-1 line, preparation of TvSP, to check intracellular ROS generation and degranulation by FACS, to determine phosphorylation of MAPK and p47phox by immunobloting.

Results

In this study, we first examined that TvSP could induce activation of MAPK and NADPH oxidase in HMC-1 cells. Stimulation with TvSP induced phosphorylation of MAPK and p47phox in HMC-1 cells. Phosphorylation of p47phox is main source of ROS generation. ROS generation is required for exocytotic degranulation of mast cells induced by TvSP. Stimulation with TvSP induced phosphorylation of p47phox, ROS generation, surface up-regulation of CD63 in human mast cells. CD63 is a marker for exocytosis. Next, to determine involvement activation of MAPK in ROS generation and degranulation in HMC-1 cells induced by TvSP. Pretreatment with MAPK inhibitors strongly inhibited TvSP-induced ROS generation and exocytotic degranulation. In addition, pretreatment of TvSP with lipase, but not heat or proteinase-K strongly abolished the stimulatory effect on phosphorylation of p47phox, ROS generation. These results showed that TvSP-contained lipid mediator LTB4 is signaling molecule. Finally, pretreatment of HMC-1 cells with antagonists for LTB4 receptors BLT1 or BLT2 abolished the stimulatory effects of TvSP on NOX2 activation and ROS generation.

Conclusion:

Our results suggest that crosstalk between *T. vaginalis*-derived LTB4 and host BLT receptors can activate MAPK-dependent mast cell activation.
Prevalence of HIV and Syphilis in university students

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Background

Our country level registered communicable diseases in 2014, 45.6% of them is STD. 43.3% of the affected people by STD are aged between 15-24 years which demonstrated that they have more risky sexual behavior.

Goal

This study aimed that to identify level of prevalence of HIV and Syphilis within university students, to investigate their risky sexual behavior, and to treat them including their sexual partners.

Materials and methods

The survey included over 1500 students for screening tests for HIV/Syphilis were performed locally using On Site™ rapid test kits.

Results

Through the test not revealed any HIV case, only 40 (2.6%) students diagnosed by syphilis. Screening and confirmation tests for syphilis were performed locally using Rapid Plasma Reagin (RPR) and Treponema Palladum Hemagglutination Assay (TPHA), respectively. The test revealed the diagnosis for first time for 22 (55%) of those 40 patients with syphilis and 18 (45%) are defined as the control of STD. Therefore, 28 (70%) of them manifested symptoms of STD, only 25 (89.2%) of them previously tested and 9 (32.1%) have not treated at all.

Conclusions

Through the test not revealed any HIV case, only 40 (2.6%) students diagnosed by syphilis. 17 (42.5%) of those students had more than one sexual partners, 31 (77.5%) not used to use condoms which confirm that they have risky sexual behavior and transmit disease to the partners. Finally, above 40 patients are entirely included in treatment with their partners and registered of STD can be controlled.

Key words: STD, HIV, syphilis, behavior, attitude
Regional Measles Elimination in the Western Pacific: Progress, Challenges and New Strategies

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Background

In 2003, the WHO’s Regional Committee for the Western Pacific decided that measles elimination should be one of the pillars to strengthen immunization programmes, and in 2005, the Regional Committee resolved that the Region should aim by 2012 to eliminate measles.

Objectives

To summarize progress and achievements in implementation of the Western Pacific Regional Plan of Action for Measles Elimination from the following aspects: (1) immunization; (2) measles incidence; (3) epidemiologic surveillance; (4) laboratory support; (5) preparation for rubella elimination; and (6) interruption of endemic measles virus transmission in several countries, analyse the region-wide measles resurgence in 2013-2015, and introduce a proposed new strategy for measles and rubella elimination in the Region.

Results

All countries and areas in the Western Pacific have actively conducted the strategies and activities for measles elimination proposed by the 2003 Regional Plan of Action, strengthened the national immunization programmes, and significantly reduced measles transmission, morbidity and mortality towards 2012, the regional target year for measles elimination. Despite these achievements, the Western Pacific experienced a region-wide measles resurgence from 2013 to 2015. The regional measles incidence rate (per 1 million population) increased from 5.9 in 2012 to 19.5 in 2013, 70.1 in 2014 and 36.0 in 2015. The region-wide measles resurgence in 2013-2015 was attributed to (i) resurgence of on-going measles virus transmission in endemic countries, (ii) increased importation of measles virus from endemic countries; (iii) large-scale outbreaks following importation in countries with low or no documented transmission for a certain period; and (iv) multiple importations resulting in increased measles incidence in countries having achieved or approached to interruption of endemic measles virus transmission.
Conclusions

To address these issues and challenges, WHO prepared “Measles and Rubella Elimination in the Western Pacific - Regional Strategy and Plan of Action-” proposing 31 Strategies with accompanying Activities in the following 8 Strategic Areas: (1) overall planning and immunization system; (2) immunization; (3) epidemiologic surveillance; (4) laboratory support; (5) programme review and risk assessment; (6) outbreak preparedness and response; (7) partnership, advocacy, information, education and communication (IEC) and social mobilization; and (8) progress monitoring and verification of elimination.

Achievement and Challenge towards Measles and Rubella Elimination in Japan

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Measles has been historically one of the significant public health threats in Japan. In 1978, a routine one-dose measles vaccination was introduced. However, early in 2000s, the suspected number of measles cases was more than 200 thousands per year nationwide. In 2006, a two-dose vaccination policy (MCV1 to children aged 12-24 months and the MCV2 to children aged 6-7 years) with Measles/Rubella (MR) vaccine was introduced.

Due to the measles epidemic occurred mainly teenagers in 2007, the Government of Japan drew up a ‘Measles Elimination Programme’, which included a 5-years’ catch-up campaign targeting teenagers in the first year of junior high school (MCV 2-1st catch-up aged 12-13 years) and third year of high school (MCV 2-2nd catch-up aged 17-18 years) to compensate for those who had not received 2nd dose of the MR vaccine. This strategy is also reflected by the result of measles seroprevalence study, in which the immunity gap was observed among teenagers. After the introduction of this campaign, the number of reported measles cases had decreased more than 98% and the Japanese indigenous virus strain D5 had not been reported since May 2010. And, the seroprevalence survey for children aged 2 years and older indicates that more than 95% of the population has reached a level of protective immunity since 2011. Although a resurgence of measles was observed from 2013 to 2014, this did not become a national epidemic. And, on 27 March 2015, Japan was verified by WHO as achieving measles
elimination. However, we are still facing measles outbreaks originated from imported cases (genotypes mostly B3, D8 and H1) even now. Also, rubella was epidemic from 2012 to 2013 with the result of 45 cases of Congenital Rubella Syndrome (CRS). In order to maintain measles elimination and to achieve rubella elimination, we must strengthen our effort.

Experiences of new vaccine introduction in Mongolia

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Since Mongolia introduced smallpox vaccination (1923), 7 types of vaccines against 11 communicable diseases introduced in routine vaccination and 24 types of vaccines in volunteer vaccination. National Immunization Technical Advisory Group established and Health Ministerial order on new vaccine introduction was issued in 2011. Prior to introducing vaccines, the research has been done and in 2005 penta; in 2009 measles, mumps and rubella; in 2012 viral A hepatitis and human papilloma virus vaccines (in selected areas) were introduced separately. In order to reduce morbidity, mortality of young children, invasive bacterial disease surveillance is started since 2007 in UB; PCV impact study is started in 2015 and Rota viral diarrhea surveillance is continuing since 2009.

Results:

After introducing some vaccines in immunization programme, smallpox and poliomyelitis eliminated; no cases of diphtheria, tetanus, pertussis were registered in last 10 years; cases of mumps reduced by 2 times, rubella and hepatitis A cases are reduced by 20 times; HBs Ag carriers among <5 children is reached to 0.53%; measles cases are reduced dramatically and no case of measles is registered during 2011-2015. In June 2016, PCV13 vaccine has been introduced in Sukhbaatar and Songinokhairkhan districts. Routine PCV is given at 2, 4, 9 months and 2 doses of supplementary PCV is provided for 3 months to 2 years old children. 61 percent of healthy children (n=1000) in these districts are S. Pneumoniae carriers. In the future we are planning to introduce new vaccine and bio-products into the immunization programme based on evidence after conducting disease burden study and research on socio economic impact and cost effectiveness analysis.
Evaluation of REDS Strategy in Mongolia 2008–2013: Findings, conclusions, recommendations

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Background

In Mongolia, REDS is a strategy to help deliver existing health and social services to hard-to-reach populations. The pilot of REDS had started in 2008-2009 with strong technical and financial support of UNICEF and WHO. Since then it been introduced in eight aimags and six districts in period of 2008-2013. UNICEF has been the main advocate and driving force for REDS and the population groups it targets. GAVI’s and WHO’s support finished in 2012. Ministerial Decree 154 and the REDS support plan expired at the end of 2013. The UNICEF’s support in two areas are ongoing, until the end of 2016.

Goal

To evaluate effectiveness, efficiency, sustainability, relevance, and impact of the REDS.

Materials and methods

The review of relevant documents, analysis of secondary data in-depth and focus group interviews/discussions over 180 people and site visits were used. The team visited 6 soums, 7 khorooos and 4 FHCs at aimag with REDS; and 3 soums, 2 khorooos and 1 FHC at aimag with non-REDS.

Findings

- Approximately 40% of the country’s population lives in an area that is or has been covered by REDS.
- The model of inter-sectoral working groups clearly is not a succeeded. It is worthwhile to explore the options of establishing a working relationship between the recently revived “livelihood councils” of the social welfare system and the FHC’s and SHC’s.
- PHC is under-resourced and understaffed, general strengthening of PHC is necessary to help function and to reach the hard-to-reach.
- Currently REDS is a vertical programme and a more integrated approach is desirable.

Conclusions:

In spite of the lack of commitment at various levels and the many constraints, there are sufficient positive examples showing that reaching the hard-to-reach is possible. As long as financial and supervisory REDS support is given to the health centres, reaching the hard-to-reach is effectively done.
Vaccine hesitancy

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Background

As a result of the routine immunization programmes in Mongolia, the incidence of diseases which can be prevented through vaccination has decreased significantly. However recently up-to-date vaccination coverage for children has decreased nationwide, particularly notable is a decrease to 78% as of 2013. The reasons and affected risk factors behind vaccine hesitancy are unknown in Mongolia. Therefore, this research was conducted under technical support of UNICEF.

Goal

Assess knowledge, attitudes, beliefs and practices to vaccine uptake, and factors and constrains that affecting the vaccine hesitancy among parents/caregivers and multilateral partners of the immunization programme remain purpose of this research.

Material and methods

This research is employed both quantitative and qualitative methods. Data were collected in May 2016 through a standard questionnaire (n=300). Qualitative research data were collected by focus group discussions (n=83) and individual interviews (n=46) among various multilateral partners and participants of immunization programmes. Descriptive statistical comparisons were made for the entire data set.

Results

The majority of the parents/caregivers agreed on the importance of vaccination to protect their children’s health and prevent the infectious diseases. Thereof knowledge on benefit of vaccine was indicated 93.5%, and information seeking attitude 51.0%, lack of trust in vaccine safety 27.3%; dissatisfaction with communication of health workers responded 13.7%; the percentage of parents/caregivers who delayed vaccination of their child was shown 16.6%; and the percentage of parents/caregivers who did not complete vaccination of their child was 14.1% in this research.

The most common reasons behind vaccine hesitancy, as responded by study participants, were: vaccine-related negative information, fear of adverse events, and insufficient counseling skill and careless service of physicians and nurses.
Conclusions

A diverse communication strategy with modern approaches on immunization should develop and implement depending on the specific conditions of aimag, soum, city center, remote people as well as minority of population.
International Cooperation in the field of sanitary protection of the territory

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The Federal Service for Supervision of Consumer Rights Protection and Human Well-Being (Moscow, Russian Federation) or Rospotrebnadzor carries out purposeful work aimed at the development and strengthening of cooperation with international organizations and agencies of foreign states responsible for ensuring sanitary and epidemiological well-being of the population. Rospotrebnadzor for the Republic of Buryatia (Ulan-Ude, Russia) has been cooperating with the state authorities of Mongolia on the prevention and prophylaxis of the spread of communicable diseases for more than 20 years. In recent years we've had a more active cooperation, which served as the signing of the 2013 Memorandum of Understanding between Rospotrebnadzor (Moscow) and the State Specialized Inspection Agency (SSIA) of Mongolia (Ulaanbaatar) on cooperation in the field of sanitary protection of the territory, as well as the signing of the 2010 Agreement between the Directorate of Rospotrebnadzor for the Republic of Buryatia (Ulan-Ude, Russia) and SSIA of Mongolia (Ulaanbaatar, Mongolia). Within the frame of the agreement, statistical and operational data and information on the sanitary-epidemiological situation, the occurrence of emergency in the field of public health and preventive and anti-epidemic measures taken have been mutually exchanged by the parties. The exchange of work experience on the organization of laboratory research is conducted in laboratories of microbiology, virology and sanitary-hygiene. Moreover, joint scientific conferences, meetings, seminars, business workshops and trainings. Thus, in 2011-2016 the parties carried out the exchange of operational data and information on the epidemiology of influenza and SARS in the territory of Mongolia and Buryatia, as well as in connection with the registration of incidence of rabies in animals in the areas bordering with Mongolia. This has enabled both parties to take prompt management decisions. In 2015-2016 the parties collaborated on the exchange of information related to the complication of the epidemiological situation of measles. Currently, a national programme entitled “Eliminating measles and rubella in the Russian Federation” has been implemented in the Republic of Buryatia and its main objective is to
eliminate measles and rubella by 2020. The achieved high level of coverage of anti-measles vaccination in the republic population enables the country to preserve the epidemiological well-being of the population on this disease. In comparison with the pre-vaccination period, the incidence of measles in the Republic of Buryatia has fallen by more than 400 times: from 822.3 cases per 100,000 populations in 1968 to no cases in 2011. In 2011-2014, no measles cases were registered. However, in 2015, new incidences of measles caused by genotypes N1NK12 and H1, specific to China and Mongolia with no record of previous circulation in the Russian Federation, were identified in the republic.

In connection with the introduction of the 2014 visa-free regime between Russia and Mongolia, the passenger traffic has increased by 2 times, with a 10 percent increase in the number of vehicles crossing the Buryat section of the Russian-Mongolian border. If in 2014 the sanitary-quarantine control covered 283,272 people, and 105,099 units of transport, by the end of 2015, these were increased to 531,285 people and 116,565 units of transport. In the first 9 months of 2016, the sanitary-quarantine control covered 409,768 people and 112,729 units of transport. Under these circumstances, the special importance of epidemiological well-being of the two countries requires our cooperation and good quality sanitary-quarantine control at checkpoints across the Buryat section of the state border of the Russian Federation and Mongolia. For this purpose, joint training workshops have been conducted with the introduction of conditional patients. For example, training exercises were conducted in automobile checkpoints of Kyakhta (Russia) - Altanbulag (Mongolia) in 2013 and Mondy (Russia) - Hanh (Mongolia) in 2015 and attended by representatives of WHO in Mongolia, the World Bank, the SSIA, the National Emergency Management Agency (NEMA), the National Centre for Communicable Diseases (NCCD), the National Centre for Zoonotic Disease (NCZD), the staff of specialized inspection services at border points of Mongolia and administration of the town Suhbaatar. From the Russian side, representatives of Rospotrebnadzor for the Republic of Buryatia, scientists of the Irkutsk Anti-plague Research Institute of Siberia and Far East and local authorities attended the trainings. The complex of necessary measures undertaken by all involved services in the regulated time allowed the participants to localize and prevent the further spread of dangerous diseases. In general, the training exercises demonstrated the commonality of approaches and views on the implementation of preventive and anti-epidemic measures.

In order to implement the Agreement between the Government of the Russian Federation and Mongolia on the protection and rational use of transboundary water of 19 June 2014, and under the Agreement on Cooperation between the Directorate of Rospotrebnadzor for the Republic of Buryatia and Specialized Inspection Agency of Selenge aimag of Mongolia, a joint
research on the assessment of transboundary pollution in the Selenge river and its tributaries and the risks to public health of the Republic of Buryatia and Selenge aimag of Mongolia has been carried out. In accordance with the approved programme, laboratory studies are conducted on the sanitary-chemical, microbiological and virological indicators: on the part of the Russian Federation - in border alignments of 5 rivers (Selenge, Chikoy, Kiran, Zheltura and Kyahtinka); on the part of Mongolia - 5 rivers (Selenge, Hiagt, Zelter, Tsoh, Hyarans). During the first 9 months of 2016, in the border sites of transboundary rivers of the Republic of Buryatia, the proportion of samples that do not meet the standard norms of sanitary-chemical indicators reached 63.2 percent (60.42% in 2014 and 52.6% in 2015), and by microbiological indicators the result was 39.2 percent (37.1% in 2014 and 27.8% in 2015). By parasitological indicators, all the studied samples corresponded to the hygienic standards and pathogens and Vibrio cholerae were unidentified. The main indicators of poor water quality of transboundary waters are the shared and thermo-tolerant coliform bacteria, iron, manganese, chemical oxygen demand (COD) and organoleptic properties (color and turbidity).

Every year, the staff of the Directorate of Rospotrebnadzor for Buryatia and SSIA of Mongolia participate together in the meetings authorized by the governments of the Russian Federation and Mongolia to discuss implementation of the Agreement on the Protection and Use of Transboundary Waters. As a result of monitoring the condition of transboundary water bodies in the locations of priority public use of water and the negative impacts on the water bodies of business entities, proposals on measures to be taken to eliminate the negative impacts on public health have been developed for public authorities. For example, in order to reduce anthropogenic pollution in the Kyahtinka river, sewage treatment plants in the city of Kyakhta are under construction, within the framework of the federal targeted programme named “Protection of Lake Baikal and the socio-economic development of the Baikal natural territory during the period of 2012-2020”. I would like to point out that the current epidemiological situation in the world and the emergence of new infections posing a threat to public health witness the need for further cooperation. I propose to continue the systematic work on the development of cooperation in the fight against communicable diseases for the benefit of the citizens of Mongolia and the Russian Federation.
FETP development in China

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FETP, China CDC, PRC

Established in 2001, the Chinese Field Epidemiology Training Programme (CFETP) has enrolled 298 of China’s epidemiologists from national and local level public health agency to respond to health emergencies and serve as future public health leaders. The training with two months of case-based introductory course, and then trainee are placed at field training bases throughout China and China CDC units. During the over 20 month’s field practicing period, they conduct public health surveillance, emergency epidemiologic investigations and applied epidemiologic studies with mentoring from supervisor and field mentors. Also, CFETP played great role in public health emergence response included SARS - 2003, melamine in milk - 2008, H1N1 - 2009, H7N9 - 2013, Ebola-2014-2015. As of 2015, 223 trainees have been graduated, but most from eastern and middle area, few from western area. Besides national level FETP, a lot of provincial and local CDC has developed FETP since 2004 and the FETPs networks has been existed in China and over 2880 residents already graduated. However, the duration, curriculum, teaching materials and training requirements has not standardized, the training quality has became important concern. September, 2015, one of specific consensus reached from China and US president was strengthening cooperation on public health by expanding FETP.

The highest political commitment is tremendous impetus to the further expansion of FETP in China. China CDC developed a new project called China Western FETP on Feb., 2016 and designed as intermediate level programme with 9 months on-the-job training. The 40 trainee of the first cohort recruited from 13 western provinces will be graduated at Nov., 2016. There is a lot of challenging while we expanding FETPs including strengthen mentorship to maintain and increase training quality, disseminate and evaluate advanced, intermediate, and basic curriculum, teaching materials, develop mentor assisting network for provincial and local FETPs.
Real-time Direct RT-LAMP method for the diagnosis of the respiratory tract viral infection

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Recently, respiratory tract infections caused by emerging viruses such as MERS coronavirus and avian A/H7N9 influenza virus were identified, while many kind of common respiratory viruses including seasonal influenza viruses circulated in human. Early diagnostics and detection of the emerging respiratory infectious virus lead to a cure and preventing the spread of infection, however, it is difficult to diagnose the causal virus by clinical symptoms. To resolve this issue, we have developed a rapid diagnosis method using real-time direct RT-LAMP assay for detecting many kind of respiratory viruses simultaneously. The reaction of this method can be performed without nucleic acid purification steps and completed within 30 minutes after adding the lysis buffer including clinical specimen to the dried form reaction reagent. This method have a same sensitivity and specificity as real-time PCR for detecting respiratory viruses, and is simpler and quicker than real-time PCR to obtain a result. In this presentation, we will show the result of our novel method applied for the surveillance of the respiratory tract viral infection in Japan and Mongolia. Our novel method is considered valuable not only for identifying a pathogen but for the surveillance and the infection control of respiratory viruses at hospitals, local laboratories, and quarantine laboratories.

Linking ecological factors to understand the occurrences of infectious livestock and wildlife diseases and modelling potential distribution of infectious diseases

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In recent years, there has been increasing concern about the potential role of long distance migratory wild animals in spreading emerging and re-emerging infectious disease agents over large geographical areas. Because of this, international community and governments of most countries have increased their efforts to understand, control and contain the infectious disease
outbreaks. At same time, there are emerging concerns related to wildlife conservation. It has become very important worldwide to step up studies targeting zoonotic diseases with special attention given migratory birds. Same high level attention should be considered in Mongolia because most of the birds in the country are long distant migratory species. Literature search on wildlife diseases studies conducted in Mongolia to date has revealed that Mongolian wildlife disease research and programmes have mostly focused on major infectious diseases with significant public and ecosystem health concern. Although many important works have already been done, what most importantly lacks is the consistent effort to regularly collect baseline data through active surveillance on regular basis and the study and inventory for non-infectious and infectious diseases. Under normal condition most zoonotic disease agents stay idle and a little change in the environment can create conditions for some viruses to become deadly. For example, avian influenza virus is found commonly among many species of water birds in low pathogenic form. But, recent events (high path avian influenza outbreaks) suggested that some of those low pathogenic influenza viruses can become highly toxic and potentially can cause serious public health and economic consequences. Avian ecology and migration research in Mongolia is intensifying and many modern technologies are being used to advance our understanding of bird migration. One example is that researchers are using satellite and cellular tracking technologies to track bird migration in great detail. As a result, information on the timing, stopover site locations, and migration paths of many species have been identified. It turned out that many migratory species do come from or fly through vast infected landscapes in East and South East Asia. Also it did not take much time for some species to move between those infectious disease hot spots and Mongolia. It suggests that there is a strong need to increase wild bird disease surveillance in Mongolia and other means to understand potential impacts. We suggest to utilize a holistic approach through computer modeling by combining infectious disease occurrence data, wild bird migration data, and remote sensing and GIS products to generate potential geographical distribution map of infectious diseases with additional information on arrival and departure timing of migratory birds. Who can benefit from such computer generated models and why we need it? The products from such work, e.g. potential distribution map, will allow us to understand environmental factors that shape spatial distributions of disease. Also the spatial distribution map of an infectious diseases agent can be later on used to develop management policies and take preventive counter measures in case of outbreak. In case of highly pathogenic avian influenza, such potential distribution map of avian influenza virus prevalence in Mongolia could provide us an opportunity to identify target surveillance areas and allocate our limited resources to monitor and control avian influenza outbreaks in the country. But
this will be a major undertaking that needs multidisciplinary participation and cooperation involving various wildlife biologists, human and livestock health sectors at different administration levels.

Result of the risk-assessment for mosquito-borne diseases in Mongolia

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Background

In 2015, there were an estimated 438,000 malaria deaths worldwide. Approximately 3600 mosquito species of 41 genera are known in the world. Mosquitoes are the main vector of malaria, Japanese encephalitis, Dengue fever, yellow fever, West Nile fever and Zika. In Mongolia 22 mosquito species of four genera had been described. In few cases of human malaria that have been recorded in Mongolia, the patients were all found to have contracted the infection in tropical countries.

Goal

To survey the potential risk of mosquito-borne diseases among the population

Material and Methods

The population-based active surveillance was conducted by the cross-sectional method. The questionnaires and blood samples were collected. We used the mosquito-borne diseases surveillance protocol (number 24 A/78) approved on 12 December, 2014.

Result

We conducted mosquito surveillance in Selenge, Khovd, Uvs, Dornod province and Ulaanbaatar city of Mongolia in 2012 August 9 to September 13, 2015. In totally 3613 mosquitoes were collected and 232 people were included in the questionnaires survey. Dengue, West Nile fever, Japanese encephalitis
and malaria were tested in mosquitoes and human serum. Laboratory tests indicated that there was no positive result among people, while 11.07% of mosquitoes were tested positive for Dengue and West Nile fever.

**Conclusions**

In the result of this study, people do not care and pay attention even they know where mosquitos exist and bite. Although in 62.4% of people had local reaction after mosquito bite and no one detected mosquito borne diseases. As a result of the study, we revealed 6 species of 3 genera, and from that distribution of species *Culex vagans* was registered newly detected in Bulgan Soum of Khovd Aimag. We found *Anopheles maculipennis* mosquito species which becomes vector of malaria in Dornod and Selenge Aimags. The abundance of mosquito and some weather variables was low correlation with statistical significant. And Japanese encephalitis, West Nile Fever and Dengue genus was detected from few mosquitos.

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**Clinical, diagnosis and treatment of anthrax**

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**Introduction**

Between 2003-2015 222 cases of anthrax were registered in Mongolia, 21 cases were in Bulgan province. But the incidence rate per 10000 population is higher than national average.

**Goal**

To identify common clinical, and to evaluate diagnosis and treatment for anthrax.

**Materials and methods**

Between 2003-2015 21 patients were cured in Buregkhangai, Orkhon, Khyalganat, Khishig-Undur villages of Bulgan province for anthrax. Study process. From 2003-2015 21 patients were registered in Bulgan, 7 cases were in 2006. 18 cases were registered in fall from August to October. Over the last 13 years, the epicenters were in Buregkhangai’s Takhilt and Derst 12(57.1%). For epidemiological questionnaires 5/23.8%/ cases infected during dug hole
the construction place, dung clearance, and 16/75.2%/ cases infected during
dead animal skin skinning and cleaning intestines, sheep skins, eating dead
meat. The youngest patient of anthrax was 5 year old child, the oldest was
64 year old woman. According to age groups 12(57.1%) of the patients were
30-49 years old. According to gender 13(62%) were man. Anthrax primary
blister on the hand is 15/71.4%//. On the forehead, cheekbones, cheeks face
exposed parts 6/28.6%/.. Primary blister converted into a painless black
five 18/85.7%//, no black five 3/14.3% cases in Bulgan sum the epicenter
Gesegt. During the anthrax other clinical are vomiting 1/4.8%, anorexia
2/9.5%, nausea 3/14.3%, headache 6/28.5%, fever 11/52.4%, and
enlarged glands 12/57,1%/.. Of the 21 cases 14/66.6% pre-diagnosed in
General hospital laboratory by reaction askol, view bacteria, and 100% certified
diagnosis in laboratorys NCZD, ZDC Selenge province by serological indirect
blood agglutination reaction 17/80%/., enzyme fixation reaction 18/85.7%/.
For anthrax 11/52.3% cases lyed at hospital 31-80 days, the average length
of stay is 33.3, minimum is 14 days, maximum is 94 days. The average costs
of medication are 166595 tugrug, maximum is 622155, average costs dressing
wrapping material are 20498 tugrug, maximum is 88445 tugrug. In severe 2
cases used anthrax specific Immunoglobulin injections.

Conclusions

In last 13 years in fall 30-49 years olds are ill for anthrax caused by
sufficient dead animals in Bulgan province. Skin form of anthrax is usually
infected in hand, has created swelling, blisters and black five. Pre-diagnosed
in General hospital laboratory by reaction askol, view bacteria, and 100% certified
diagnosis in laboratorys NCZD, ZDC Selenge province by serological indirect
blood agglutination reaction, enzyme fixation reaction.

Clinical diagnosis of tick-borne infections

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Introduction

Exposure of tick-borne infections is higher in Selenge, Bulgan, Khentii,
and Arkhangai provinces. Cases of the tick-borne infections per 10000 people
in Bulgan province is above the average of the country and other provinces.
Goal

To determine common epidemiology and clinical types and to estimate diagnostics and treatment.

Materials and methods

1. Medical histories and enclosures of 20 patients infected by tick-borne infections treated in Medical hospital of Bulgan province.
2. Survey of tick-borne infections epidemiology
3. Report released by infection study team to National Center for Zoonotic Disease (NCZD)

Research methods: The research was conducted with descriptive research or epidemiology method using statistic data, first stage blanks, average figures based on researches, minimum and maximum figures, tables, and charts.

Research process: Between 2009-2014, 16 cases (80%) of the 20 patients were recorded in April, May, June and 5 cases (25%) in 2013. 9 patients (45%) were bitten in Gezegt, Ereenii uvur, Tuluu mountain pass, 6 patients (30%) near Burgastai border post of Teshig soum. 16 patients (80%) were bitten on the skin including 12 patients (60%) were bitten on head, 3 (15%) on ears and 1 (15%) on neck. 17 patients removed mites themselves. 9 (45%) were children, 5 (25%) were unemployed. 8 (40%) children were bitten while they were playing with lambs and young goats, 4 (20%) unemployed were bitten while they were preparing timber, picking up wild fruits, 5(25%) herders were bitten while they were pasturing livestock. The youngest patient was two-month old, the oldest was 52 year-old. Age ranges: 9 (45%) were between 0-18 years old, 7 (35%) were between 21-40. 12 (60%) were male. Common symptoms: fever 17(85%), strong headache 11 (55%), gland enlargement 9(45%), mite rash 9(45%). 17 (85%) were treated in hospital for 6-10 days (7 days in average). The average treatment fee is 22087 tugrug. Blood plasma was sent to NCZD in Ulaanbaatar and CZD in Selenge province, however, immunological examination result of 4 cases and 1 molecular biology examination result were received and enclosed with patients' medical histories. 15 (75%) results haven’t been received.

Results

1. People, preparing timber, picking up wild fruits and herding livestock, and children, playing with lamb and young goat are more infected by tick-borne infections.
2. Children and labor-force age men are more infected by tick-borne infections.
3. Fever, strong headache, gland enlargement and mite rash are dominant symptoms caused by mite bite.
4. Patient’s blood plasma is sent to CZD in Selenge province and NCZD in Ulaanbaatar and few examination results are received.

Conclusions:
1. People, preparing timber, picking up wild fruits and herding livestock, and children, playing with lamb and young goat are more infected by tick-borne infections and experience the symptoms like fever, strong headache, gland enlargement and mite rash caused by mite bite.
2. Tick-borne infections is being examined and treated only in clinical because immunology examination is not being made in Medical hospital of the Province.

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Molecular epidemiology, antimicrobial susceptibilities and resistance mechanisms of Streptococcus pyogenes isolates in Mongolia

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Background

Streptococcus pyogenes is a leading cause of morbidity and mortality worldwide, causing an estimated 1.8 million new cases and 517,000 deaths each year. This burden is drastically skewed to low-income countries, where it causes a wide variety of acute infections and post-infectious sequelae, including rheumatic heart disease and acute rheumatic fever.

Goal

The goal of this study was to investigate the molecular epidemiology and antibiotic resistance patterns of S. pyogenes isolates in Mongolia.

Material and methods

A total of 38 isolates of S. pyogenes isolates were collected from 2007, 2008 and 2016 by the National Center for Communicable Diseases (NCCD)
in Ulaanbaatar, Mongolia. A total 18 samples of *S. pyogenes* were sent to the University of Iowa Centers for Infectious Diseases (CEID). Isolates were confirmed to be *S. pyogenes* by amplification and sequencing of the 16S rRNA gene. Following confirmation, the major target of epidemiological strain typing, the *emm* gene, was amplified and sequence. In all 38 isolated was detected antibiotic susceptibility.

**Results**

A total of 18 *S. pyogenes* isolates from 2007-2008, resistance was observed to the following antibiotics: erythromycin (2/17, 11.8%), cefotaxime (1/15, 6.7%), ampicillin (1/17, 5.9%), ofloaxacin (2, 11.8%), and penicillin (5/17, 29.4%). Instead in 20 isolates of 2016, resistance was observed to the following antibiotics: erythromycin (11/61.1%), trimethoprim-sulfamethoxazole (20/100%), ampicillin (2/10.0%), and vancomycin (2/10.0%). Twelve distinct *emm* types were observed among the 18 collected *S. pyogenes* isolates, marking a diverse population of *emm* types presenting within Mongolia. Two of the isolates were *emm* type emm12, which is the same *emm* type responsible for a majority of cases of scarlet fever during a 2011 outbreak in China.

**Conclusions:**

*S. pyogenes* emm12 strain responsible for the outbreak may be circulating in Mongolia. In Mongolia the isolates of *S. pyogenes* were resistant to penicillin, erythromycin, trimethoprim-sulfamethoxazole.

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**Current situation of natural plague foci in Mongolia**

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During 1976-2015, about 2924 plague strain have detected from species of *Y.pestis* pathogen from 102 soums of 14 provinces plague natural foci and human cases. Those plague pathogen was detected from rodents, rodent’s carcasses (67%), ectoparasite (26.8%), infected patient by plague (5.6%). In additional, plague strain (0.4%) was found from steppe fox, polecat and silkworm in our country. In Mongolia during 1976-1995, by average plague strain detection and human cases was registered in 20.2 soums of 6.1 provinces in every year and during 1996-2015, plague epizooty has been activating in 10.5 soums of 5.9 provinces in every year. In last year with
active plague epizootics provinces number has reduced by 49.3%, soums number has reduced by 34.3%. Within last 20 years prevalence of plague has narrowed, density has reduced by 50-90% depending on social, financial, climate change. Considering by active of plague natural foci epizootic, dynamic of landscape, detection of culture, human cases: in last 40 year, plague foci was active in foci Mongol-Altai, Khangai, Khentii’s regional which include mountain steppe, steppe and gobi or desert. In above regional focus concern to territory focus of 45 soums of 9 provinces has detected strains during 1980-1991 for each year and there was active plague epizootic. In those natural foci has determined Y.pestis (94.8%), Y.pestis altaica (2.7%), Y.pestis ulegeica (1.7%) Y.pestis mediavalis (0.6%) and 4 sub species pathogens and particularly from Arkhangai province detected only Y.pestis pestis sub species pathogen. An average of above active epizootic foci is 11.3 year, average of less intensive is 13.8 year. In Zamiin-Uud soum of Dornogobi provinces, Deren soum of Dundgobi provinces Undurkhaan soum of Uvs province’s foci was going epizootic with short devition into periods 1-2 year, In Sergelen soum of Tuv province’s foci during 2002-2010 every year detected Y.pestis altaica species pathogen from brand’s vole which showed active of plague epizootic. In the last years (since 2005) has been re-activating plague natural foci in Tsagaannuur, Ulaanhus, Bulgan, Altai soums of Bayan-Ulgii province, Must, Uyenich, Bulgan soums of Khovd province, Erdene-khairkhan soum of Zavkhan province, Erdene, Chandmani soums of Gobi-Altai province, Khairkhan-dulaan, Uyang soums of Ovorkhangai province, Tsetserleg, Tsagaan-Uul soum of Khuvsgul province’s and has reported human case of plague in Tsagaan-Uul soum of Khuvsgul province, Bulgan soum of Khovd province, Sant soum of Ovorkhangai province.

Case series of Malaria reported in Mongolia

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Background

Malaria is caused by parasites, symptoms are so symptoms are usually followed by fever, chills, damage of liver and spleen that is zoonotic diseases. 300-500 malaria cases reported in the worldwide. Malaria distribution is most in South Africa, South East Asia, and Sahara of Africa. River regions named of Orkhon, Tuul, Onon, Balj, Ugalz, Kherlen, Khalkh of Mongolia, has
A. Maculipennis, A. hyrcanis mosquito. In 2009-2015, total 9 malaria cases reported in Mongolia imported from other endemic countries.

Material and methods
The report information of malaria cases of NCZD (2009-2015), used the case series study.

Results
The malaria cases reported from Korea, India, Ghana, Sierraleone and South Sudan of Africa. Surveillance of all cases, were 100%. Cases were on 20-58 age range, and 66.7% was male, 100 % (9) bite by mosquito in other countries, incubation period was 34.5 days (7-150). Symptoms of cases were 88.9% fever, 66.7% hepatomegaly, and 55.5% was splenomegaly, 22.2% was jaundice. In laboratory result, 66.7% was infected by parasites in blood red cells, so 33.3% was positive IgG /+/. 

Discussion
malaria cases reported in last 5 years, increased over than 2 again from before 5 years. By investigation, control of recovery of patients with malaria parasite infection was not made. So anti-parasite drug used in practice, but some drugs of treatment categories isn’t imported into the using. Then have to develop and improve the all law, order and guide of Mongolia.

Conclusion:
All cases of malaria reported or transported from other endemic countries. Control of recovery of patients with malaria parasite is not enough, it could be disadvantage. Symptoms of cases were similar with cases of other countries.

Key words: transported, malaria, control of recovery of patients.
The rapid screening of patients with suspected infection in Mongolia using infection screening system with a compact radar, a thermopile array and a pulse photo-sensor

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Pandemics of Severe Acute Respiratory Syndrome (SARS) in 2002 and H1N1 Flu (Swine Flu) in 2009 indicated repeated epidemics in various regions around the world. In order to prevent such spread of diseases, most effective approach is to detect infected individuals in their early stages. We have developed a novel infection screening system which detects the possibility of infection from measured vital signs, such as, heart rate, respiratory rate, and facial temperature within ten seconds. This study aims to evaluate the infection screening system for its accuracy when used in Mongolia, especially for tuberculosis patients and feverous ambulant patients. At present, we modified an infection screening system (KAZEKAMO) in National University of Mongolia for the clinical study at the National Centre. Prior to the clinical study in Mongolia, we conducted a clinical trial in Japan. Within ten seconds, the infection screening system with classification algorithm using a neural network discriminates potentially infected individuals from normal subjects using heart rates, respiratory rates, and facial temperatures measured by a pulse sensor, a compact radar, and thermography, respectively. The system was tested on 57 seasonal influenza patients after antiviral agent uptake (35.7°C ≤ body temperature < 38.3°C, 19-40 years) and 35 normal control subjects (35.5°C ≤ body temperature ≤ 36.9°C, 21-35 years) at the Japan Self-defense Forces Central Hospital. At the time of measurement, approximately half of the influenza patients have already became afebrile because of antiviral agents. The system achieved sensitivity of 98%, NPV of 82%, respectively. Our system appears promising for first order screening application of tuberculosis patients who sometimes develop only low-grade fever, because this system showed its efficacy for unfebrile patients.
Peptidoglycan activates inflammatory response via TLR1/TLR2 in macrophages

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Peptidoglycan (PGN) is the major structural component of the bacterial cell wall, especially gram positive bacteria, which induces inflammatory responses. Toll-like receptors (TLRs) are known as PRRs and TLR2 is recognized as the major PGN receptor. In general, TLRs interact with other different coreceptors as well as with each other for full ligand sensitivity, and TLR2 is involved in cooperation with other TLRs, particularly TLR1 and TLR6, while the dependence of TLR1/TLR in peptidoglycan induced inflammatory response is unknown. This study aims to examine the role of TLR1/TLR2 in peptidoglycan induced cytokine expression in macrophages. To determine the appropriate incubation time and dose of peptidoglycan, we studied the effects of peptidoglycan on Ana-1 cells. Cells were stimulated with different concentration of peptidoglycan for different time. The inflammatory cytokines secretion were measured by ELISA in cell culture supernatants and the transcription factors and inflammatory response related proteins were investigated by Western blot in cellular precipitates. The Ana-1 cells were pretreated with TLR1, TLR2 antibody alone or both of them for 1 h and stimulated with 25 µg/ml peptidoglycan for 6 h. Cells treated with peptidoglycan alone were used as a positive control and an equal volume of vehicle were used as a negative control. After treatment, cell culture supernatants were gathered, centrifuged to remove cellular precipitates, and assayed by ELISA. Cells were lysed, and total protein was collected for western blot analysis. We observed that peptidoglycan upregulated the secretion of pro-inflammatory cytokines IL-6, TNF-α and anti-inflammatory cytokine IL-10 in a dose- and time-dependent manner. NF-kB and STAT3 signaling pathways are involved in peptidoglycan induced inflammatory cytokines expression via a TLR1/TLR2-dependent mechanism in macrophages. Thus, peptidoglycan can activate inflammatory response in macrophages via a TLR1/TLR2-dependent mechanism.

Key words: peptidoglycan, TLR1/TLR2, inflammatory response
Hand, foot and mouth disease registered in Mongolia between 2008–2016

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Background

In Mongolia hand, foot and mouth disease started to register from May 2008, 3913 cases registered during from January to August 2016, increased compared to previous years.

Materials and methods

We used Microsoft Excel, Epi info, Arc View GIS 9.1 programmes in the analysis. The cases reported of hand, foot and mount disease (n=16095) in 2008 – 2016 NCCD, disease history (n=281) in 2016 NCCD.

Results

Hand, foot and mouth disease registered continuous from in 2013. Outbreak in from April to July, 2008, 2010, the peak in June. Outbreak in started from March, 2016, the peak in May. 96% of the total disease registered in Ulaanbaatar, 7.1% of the total registered hospitalized. 29.5% (n=83) of among hospitalized (n=281) tested laboratory (Enterovirus IgM), 38.8% (n=33) positive.

Conclusions:

Hand, foot and mouth disease high level registered continuous in recent years in among population, disease 1.5 times increased among 0-1 years in 2016.

Key words: Hand, foot and mouth, Mongolia
Outbreak of rash infections in a military training camp
in Mongolia, May-June 2014

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Background

On 19 May 2014, cases of rash infection were reported in military training camp, Altanbulag soum, Х province, Mongolia. We investigated to verify outbreak of disease, describe and determine magnitude of the outbreak and to recommend prevention and control measures.

Materials and methods

Descriptive epidemiology: A case was defined people stay in military training camp with symptoms of ear lobe itching, burning feeling, swelling or on the ear lobe and the signature paw rash. We searched for cases using combined examination, face to face interview and collected 49 specimens of nasopharyngeal swabs, serum, stool specimens for laboratory investigation. We described the outbreak by time, place and person.

Analytical epidemiology: A case control study was conducted. A case was defined as any new military trainee of the military training camp manifesting any of the following signs and symptoms: ear lobe itching, burning feeling, swelling or on the ear lobe and the signature paw rashes between 10 to 29 May 2014. A control was any well new militaries randomly selected. Cases and controls were interviewed using a questionnaire to identify transmission of infection.

Results

We identified 122 cases among about 770 persons (overall attack rate 15.8%), the 92% of all cases rash detected. The attack rate was the highest among 014 by military units (AR=22.9%), 20th tent (AR=36.7%). Symptoms were developed in soldiers in 8-14 days after arrival to the camp. Contact with sick person (OR = 146.9, 95% CI:19.8-185,2), shared tobacco smoking with peers (OR = 2.5, 95% CI: 1.5-4.2), used discarded smoking (OR = 15 and 4, 95%CI: 1.9-119,3), shared tobacco with sick people (OR = 8.2, 95% CI: 3.9-17,1) were statistically significant association with illness. Wash hands three or more times a day, wash hands (OR = 0.3, 95% CI: 0,1-0,7), participated in a cleaning (OR = 0.9, 95% CI: 0.5-1,6) had preventive effect on the illness.
Conclusions:

A point source outbreak occurred in military training camp. To contact with sick person, sharing tobacco were the risk factor for transmission of infection. We recommended as follows: Hygiene and sanitation of military training camp should be improved. Through medical examination of soldeirs before deployment to military training camp, treatment and isolation of sick person should be taken immediately after suspected case of infection is identified. Rapid reporting of any suspected event is limited environment such as camp can help to response and control measures.

Key words: Mongolia, rash infection, outbreak

Polit study of nosocomial infection forming Methicillin-resistant Staphylococcus aureus based on laboratory survey

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Introduction

Drug-resistant bacteria infections, especially high-risk factor that causes Hospital acquired infection and, as a result, causes have to be a number of additional examination, diagnosis and treatment of client prolonged hospital stay increased costs and heightened customer's clinical processes, reduction treatment. Our country NCCD report that although low compared to other diseases as reported and 2.5% of infectious exposure for every 100 people in the first in 11 months HAI 83 hospitalized cases, admissions in 2011, but the detection of the infection cases, registration and laboratories and surveillance system shows very weak. NCCD Bacteriology Reference Laboratory in 2012 identified 212 strains belong to the Calculation of the clinical sample, 60% had a sensitivity of 76% ampicillin, penicillin, resistant amoxacillin 74% and 100% ciprofloxacin 79%.
Goal

To estimate the prevalence of nosocomial infections and resistance to multiple antibiotics from staffs of hospital and patient’s samples.

Material and methods

We collected sample from the hospital surgery, emergency department staff of clinical hospital and in-patient hospital admissions 1 central hospital and 1 province hospital. 27% of medical staff (209), and patients, 73% (572) of the 18 items of the 781 samples collected, 11 MRSA traditional microbiological culture methods, vitek analyzer and antibiotic sensitivity determination diks diffusion method by 24 types of antibiotics and molecular biology methods analysis done by. We used quality control for Staphylococcus aureus Mi273 mutant ATCC 29213 strain.

Results

1. Surveyed a total of 11 cultures S. aureus 100% (11/11). 1.4% (11/781) detected MRSA total of samples.
2. Molecular biology methods to detect drug-resistant genes, 100% (11/11) were MTSA.
3. MTSA found in both hospital staffs, patients and the need to further examine whether they are related.
4. Cefoxitin 100% (11/11) resistance, vancomycin-sensitivity of 100% and 63% of the penicillin group resistant to antibiotic resistance, karbopyenyemiin group 100% 63% sensitive and 60% tsyefolasporinii group resistance, macrolides group.
5. Dick diffusion tests for MRSA focus 100% of Cefoxitin resistance, 100% susceptibility to Imipenem, Nitrofurantoin, Vancomycin, Linezolid, Quinupristin, Tigecycline, 90% Meropenem, Trimethoprin, Moxifloxacin, Gentamycin, 63-81% Cefazolin, Oxicillin, Rifampin, Tetracycline but resistance to 36-90% Ceftriaxone, Ceftrazidime, Ciproflloxacin and Levofloxacin. Drug resistance genes that warrant further study is needed
Serotyping results of pathogens of the IBDs, 2007-2016*

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Background

It is important to isolate and identify serotypes of S.pneumoniae for vaccine selection to prevent pneumonia.

Materials and methods

We conducted hospital-based active surveillance for pneumonia in children up to 5 years of age. Clinical data, blood and cerebrospinal fluid were collected according to a standard protocol. Multiplex and RT-PCR were used for serotyping.

Results

402 [1.5%] cultures were isolated from 27486 blood specimens and 248 cerebrospinal fluid and among them S.pneumoniae was detected in 153 (38%), N.Meningitidis was detected in 56 (14%), Hib was detected in 4 (1%) and other microbes was detected in 189 (47%) specimens. According to serotyping analysis, serotypes 3, 4, 5, 6A, 7F, 9V, 14, 19A, 19F, 23F of S.pneumoniae had been identified.

Conclusions:

S.pneumoniae accounts for 38% of invasive bacterial disease among children in Ulaanbaatar city and it is higher than other Asian countries. Majority of serotypes detected have been included in pneumococcal conjugate vaccine-13.

Key words: S.pneumoniae, real time PCR, pneumonia
Factors Associated With Infant Measles Mortality in a Nationwide Measles Outbreak in Mongolia in 2015–2016

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Background

Measles elimination was verified in Mongolia in 2014. A measles outbreak with nearly 50,000 suspected cases began in March 2015, with peaks in May–June 2015 and March–April 2016. The number of reported measles deaths increased in 2016, particularly among infants. We sought to identify factors associated with infant measles mortality during the outbreak.

Materials and methods

We analyzed national surveillance data of clinically-confirmed (fever and maculopapular rash; and cough, coryza, or conjunctivitis) or laboratory-confirmed (detection of measles immunoglobulin M antibody or measles virus RNA) measles cases in patients aged <12 months and influenza-like illness (ILI) hospitalizations during March 11, 2015–June 27, 2016. We enhanced detection of measles deaths with probabilistic record linkage of case-based surveillance data with death certificates. We used multiple logistic regression to examine age, sex, residence, date of rash onset, and history of hospitalization within the measles incubation period (7–21 days before rash onset) as possible risk factors for infant measles mortality.

Results

During the study period, 7,108 confirmed measles cases and 116 measles deaths occurred among infants (8 [0.3%] deaths among 2,641 cases in 2015, and 108 [2.4%] deaths among 4,467 cases in 2016). Of the 116 deaths, 97 (84%) were identified by case-based surveillance, and an additional 19 (16%) by linkage with death certificates. Residence in provinces outside the capital city (adjusted odds ratio [AOR] 3.6; 95% confidence interval [95% CI] 2.4–5.4), hospitalization during the measles incubation period (AOR 3.2; 95% CI 2.1–4.9), and rash onset during February–March 2016, a time when infant
ILI hospitalizations peaked (AOR 1.9; 95% CI 1.3–2.8) were significantly associated with measles mortality.

Conclusions

During a prolonged measles outbreak in Mongolia, measles mortality peaked when ILI hospitalizations peaked and was associated with hospitalization during the measles incubation period. Exposure to measles virus in healthcare settings might have infected children with comorbid conditions. Preventing healthcare-associated measles virus infections and protecting infants from influenza virus infection might reduce measles mortality.

Disclosures: The authors report no conflicts of interest.

Influenza Burden of Disease Estimates in Mongolia during 2014/2015 season

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Background

Mongolia is a vast and sparsely populated country in Central Asia. Its harsh climate and nomadic lifestyle make the population vulnerable to acute respiratory infections, particularly influenza. Evidence related to the morbidity, mortality and socio-economic impact of influenza is scarce, however, influenza-like illness (ILI) and severe acute respiratory infection (SARI) surveillance data are available for disease burden estimates. This study estimated the burden of influenza-associated illnesses during the 2014/2015 season using routine ILI/SARI and lab surveillance data.

Materials and methods

A total of 115 outpatient-based ILI surveillance units, 37 hospital-based SARI surveillance units, the central reference laboratory and 4 regional laboratories across Mongolia participated in the surveillance programme. Demographic and laboratory data on all patients meeting the ILI and SARI case definitions from October 2014 to May 2015 were extracted and analyzed following the methods described in the WHO Manual for Estimating Disease Burden Associated with Seasonal Influenza.
Results

A total of 385,774 ILI and 35,261 SARI cases were reported during the 2014/2015 season, accounting for 5% and 9.2% of total outpatients and admissions, respectively. According to comparison of last 4 year surveillance data, the season began in epidemiological week 40, peaking from weeks 50-10 with the average of 16,000 cases, and declined around week 15. Among ILI cases, 158,428 (41.1%) were children aged <2 years and 107,505 (27.9%) were children aged 2-5 years. A similar distribution (48.9% and 33.9% respectively) was observed for SARI cases. The estimated influenza-associated ILI and SARI incidence rates were 1,010.7 and 99.9 per 100,000 population. Children under 5 years accounted for 67% of all ILI cases and 84% of all SARI patients. However, the influenza positivity rate was highest (13.8% for ILI and 13.7% for SARI) for those aged 5-10 years. The mortality rate due to SARI was highest among children aged 0-2 years, 30.4 per 100,000 (95%CI: 21.2-43.5).

Conclusions:

Estimated incidence of influenza-associated ILI and SARI in Mongolia was higher than in many other countries in the WHO Western Pacific Region, but our findings of the most affected age group were consistent with global and regional trends. These results can inform national influenza control policies, including targeted vaccination of children and the elderly.

Limitations

High staff workload and the logistical challenges inherent in transporting samples across long distances may have resulted in non-random sampling. In addition, the influenza-associated SARI mortality rate was not estimated, as all deaths were not laboratory-confirmed.

Avian influenza surveillance in wild migratory birds of Mongolia in 2015–2016 by the Predict-2 project

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Mongolia is situated at the meeting point of two major migratory flyways (the Central Asian and the East Asian-Australasian), which is of key importance in understanding the role of wild birds in the maintenance
and spread of highly pathogenic avian influenza virus (HPAIV) H5N1. The
country first experienced HPAI outbreaks in 2005 and 2006, following the
emergence of clade 2.2 viruses in wild bird populations that were first
detected at Qinghai Lake in China. No further outbreaks were recorded
until 2009, when clade 2.3.2.1 viruses were recorded in central and western
Mongolia with further outbreaks in the east in May 2010 and neighboring
Tuva Republic in June 2010.

In response to the Qinghai outbreak, a wild bird surveillance system was
implemented by Wildlife Conservation Society (WCS) from 2005-2014 to
elucidate the role of wild birds in the transmission of HPAIV H5N1. In order to
detect the outbreaks in wild migratory birds a continuous active surveillance is
required through the country specifically targeting previous outbreak hotspots.
However, all funding for active Avian Influenza surveillance in wild migratory
birds have ended in 2013-2014. Since 2015 WCS is implementing USAID funded
PRERICT-2 Project on avian influenza surveillance in wild migratory birds and
using internationally approved protocols developed by UC Davis and partners
throughout 32 countries implementing PREDICT-2 Projects. We collect lake
bird counts, mortality/morbidity surveys, sick or dead bird necropsy and
collection of environmental fecal samples. All collected samples are stored at
the State Central Veterinary Laboratory and will be tested laboratory protocols
developed by the University of Califronia, Davis by RT-PCR and sequencing.

Additionally, wild migratory bird interaction with livestock and human
will be documented to see the possibility of virus transmission between the
species. Active surveillance will be conducted through Western, Central and
Eastern regions of Mongolia with hotspots such as Erhel Nuur (June 2005,
2009 outbreak site), Uuvs Nuur (June 2009 outbreak site), Doroo Tsagaan
Nuur (August 2009 outbreak site), and Ganga Nuur Nature Reserve (May
2010 outbreak site). And wild migratory birds of 12 species in the orders
Anseriformes and Charadriiformes have the highest antibody prevalence
from previous studies with ruddy shelducks (61.7%), whooper swans (38%),
swan geese (15%), bar-headed geese (13%), and Mongolian gulls (3.9%),
therefore we are targeting these species for fecal sample collection during
PREDICT-2 Project. Also Uvs Nuur from the Russian side had HPAI outbreaks
reported between late May to June 2009, 2010, 2016. Therefore Uvs Nuur
will be a special site actively monitored every spring with extensive efforts to
monitor lake shores on the western and northern parts. The low densities of
poultry in Mongolia, and the lack of any recorded outbreaks among Mongolian
poultry strongly supports the hypothesis that wild birds are responsible for
carrying HPAI virus H5N1 to Mongolia. However with high density of livestock
surrounding lakes may be leading to spillover of wild bird Avian Influenza
virus to livestock such as horses thus needs active surveillance not only in wild
migratory birds but domestic livestock and if possible human populations from
the vicinity. PREDICT-2 is taking One Health approach in other countries such as Vietnam, Thailand and collection samples simultaneously from wildlife, livestock and human populations. This type of approach is much needed to be implemented in Mongolia to detect emerging and re-emerging pandemics.

Clinical profiles of both influenza and respiratory syncytial virus hospitalized cases in Baganuur district as a part of severe acute respiratory infection surveillance, 2015-2016

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Background

Both influenza and respiratory syncytial virus (RSV) infection causes a certain burden in Mongolia. A severe acute respiratory infection (SARI) surveillance functions to monitor hospitalized patients. In Baganuur district, the surveillance has been established with the district hospital since 2008. This study aims to characterize profiles of clinical cases positive to those two viruses.

Purpose

To characterize hospitalized influenza and RSV cases

Material and methods

A SARI case was defined as acute respiratory illness patient whose condition requires hospitalization. Cases were tested with a point-of-care kit (quick Navi Flu+RSV, Denka, Japan). A standard questionnaire was developed to collect information about clinical course of patients. A statistical test was performed with R 3.3.0.

Results

In 2015-2016 season, total 1073 SARI cases were reported and 93.8% were tested by a point-of-care kit. Median age of those cases was 1 year and a third of cases were below 1 year old. There was only a fatal case who was
negative to both viruses. Median durations between admission and symptom onset as well as symptom resolution were 3 and 7 days respectively. We found 72 influenza A, 51 influenza B and 104 RSV positives in the season. Upon admission, all these cases developed both tachypnea and tachycardia while only 7.7% of cases showed oxygen saturation (SpO2) <90%. This proportion was significantly higher in influenza B (13.7%) than influenza A (2.8%). A frequency of sore throat was significantly high in both influenza A and B (11.1%, 7.8%) while that of wheezing was high in influenza A (6.9%) than influenza B (0%). Headache was significantly observed in influenza B (7.8%) than influenza A (0%). We then analyze further clinical course of those 3 virus positive cases.

Conclusions:

Influenza and respiratory syncytial virus causes a substantial burden in small children with severe acute respiratory infections in Mongolia.

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**Epidemiologic and virologic surveillance result during 2015/2016 influenza season in Mongolia**

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Influenza A(H1N1)pdm09, A(H3N2) and B viruses have co-circulated in the human population caused for seasonal infection every year since pandemic in 2009. The influenza annual attack rate is estimated at 5%–10% in adults and 20%–30% in children and influenza associated deaths occurred among elderly in industrialized countries and among the young children in developing countries. The WHO is recommending vaccination for people at higher risk of influenza complications before onset of influenza activity. The Mongolian National Influenza Centre is conducting the national influenza surveillance laboratory network, which includes 5 laboratories and 160 sentinel sites including outpatients clinics, hospitals across the country. It aims to monitor the epidemiological trend of ILI and SARI and monitor antigenic, genetic evaluation, antiviral drug resistance of influenza viruses circulating and providing weekly feedback reporting on flu activity at national level and report to WHO Global Influenza Surveillance Network. We are reporting
influenza surveillance results conducted in cold season in 2015/2016 years by this paper. During last cold season (from 01 October 2015 to 30 June 2016) have been registered 1,105.4 ILI cases per 10,000 population, which is 5.4% of all outpatient visits. In study period, an influenza ILL outbreak has been reached the peak in the 9th week, 2016 and registered 60.4 ILI cases per 10,000 population it higher than previous season by 2.9 cases. In 9th week of 2016, hospitalized 6.5 cases of SARI per 10,000 populations it was peak of last season and higher than than previous season by 1.6 cases. Totally 72 (0.2%) patients died of patients hospitalized with SARI and 60 (83.3%) of them were under 4 years of age. During study period we have tested 3124 samples, of which 453 (14.5%) positive for influenza including 266 (58.3%) A(H1N1)pdm09, 3 (0.7%) A(H3N2), and 184 (41%) B.

The overall positive results for other respiratory viruses were 42.3% and there were the most predominant viruses are Respiratory syncytial virus, Human metapneumovirus and Rhinovirus. The Mongolian A(H1N1)pdm09 strains were antigenically characterized as California/07/09 pdm-like; B/Victoria viruses characterized as B/Brisbane/60/2008-like and B/Yamagata viruses characterized as B/Wisconsin/01/2010-like. The HA sequences of 7 A(H1N1)pdm09 strains isolated between November 2015 and February 2016 in Mongolia belonging to genetic group 6B, subgroup 6B.1 which were similar to other recent H1N1pdm09 viruses circulating in the world region. Genetic subgroup 6B.1 viruses have predominated globally while subgroup 6B.2 predominated in some countries in Asia as CDC reported. The all influenza viruses tested antiviral resistance analyses were exhibited normal inhibition by oseltamivir, zanamivir, peramivir and laninamivir and A viruses were resistant to amantadine in the study period.
Sentinel hospital-based surveillance for rotavirus diarrhea in Ulaanbaatar, Mongolia, January 2010 through December 2015

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Background

Rotavirus is the most common cause of severe gastroenteritis among children globally. Mongolia has been actively participating in the World Health Organization rotavirus sentinel surveillance network since 2010 but does not currently vaccinate against rotavirus. We conducted hospital-based surveillance in Mongolia to describe hospitalizations for rotavirus among children aged <5 years and strain distribution patterns during the 6-year study period.

Materials and methods

Children aged <5 years hospitalized with acute watery diarrhea were prospectively enrolled and evaluated by trained pediatricians at two hospitals (National Center for Maternal & Child Health [NCMCH] and Sukhbaatar District Hospital [SBDH]) in Ulaanbaatar, Mongolia. Fecal specimens were obtained and tested by rotavirus antigen detection enzyme immunoassay at the National Reference Laboratory (National Communicable Diseases Center). A subset of specimens that tested positive for rotavirus were further characterized to determine the genotype of strains by reverse-transcriptase polymerase chain reaction.

Results

From 1 January 2010 through 31 December 2015, a total of 5,326 (85.6%) of 6,223 eligible children with diarrhea were enrolled. Based on hospital data, the proportion of hospitalizations due to watery diarrhea among children <5 years were 6.7% at NCMCH and 13.8% at SBDH. Of 5,279 children who had specimens tested, 2,456 (46.5%) had results positive for rotavirus. Almost half (49%) of children admitted to the hospital due to rotavirus were aged 6-11 months. Rotavirus hospitalization was more common from late autumn to early winter (September through December). Among 1,036 rotavirus-positive specimens that were genotyped, G3P[8] was the most common genotype among rotavirus strains collected (43%), followed by G9P[8] (21%) and G9P[6] (16%).
Conclusions:

Surveillance data demonstrated that rotavirus is an important cause of diarrhea among children <5 years and that peak months for rotavirus diarrhea were from September to December. These data will be crucial for informing a decision by the Mongolian government on rotavirus vaccine introduction.

Clinical and Epidemiology Specific characteristics of morbidity due to measles in NCCD

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Background

Measles is the main factor of the mortality rate of infants. It is a highly contagious, serious disease caused by a virus. The measles caused 2.6 deaths each year in 1980s before the development of the vaccine. Accelerated immunization activities have had a major impact on reducing measles deaths and global measles deaths have decreased by 75% from an estimated in 2000-2013. According to the data released by the WHO in 2013, 145,700 under age 5 died from the measles, which means 400 fatalities in a day and 16 occurred in an hour world widely. However, the world has been using the measles vaccines that are safe, effective and affordable enough for 40 years, the vaccine-preventable disease is still becoming the main factor to the high mortality rate of the children all over the world.

Goal

To study to make conclusions on the clinical and epidemiological characteristics of the patients with measles and their lab tests.

Materials and methods

Descriptive studies have been done on the treatment history of 128 patients that had been hospitalized in NCCD with measles and lab test results of ELISA, were revealed as.

Results

The studies have shown that 68.7% of the total patients hospitalized with measles, were under age 5, 10% of age 6-10, 0.78% of age 11-15, 7% of
16-20 and 13.3% of them were above the age of 25 respectively. 52.7% of the patients were males whereas its 47.2% of them were females. 65.6% of the patients were stay-at-home individuals and 5.46% of patients go to kindergarten whereas 3.9% of the patients go to school and of 9.3% were students and 10.9% of them have a full time job. For the immunization activities against measles: 57.6% of the patients never have vaccinated previously or they were under the age of vaccination. 7.2% of the patients were involved in immunization once whereas the 6.4% of them were involved twice and 28.8% of the patients did not know whether they had immunized before. As we clarified the way they had the contagion: 9.77% of them were among the family members infected and 39.8% of them were previously hospitalized with infected patients. 1.5% were transmitted from the schoolmates and the reasons of 42.1% were unknown. Symptoms: Fever, blistered rashes symptoms were both observed to all patients and the symptoms mainly were they have lost appetite and coughing (85.9% of them). For the complications of the patients, 53.3% of the patients suffered from pneumonia and 9.3% of them suffered from tetanus. In the early stages of the measles, cells number in patients’ general blood test were 259±122 and period of illness it came to 445.5±201.5. In the biochemistry test to the liver functions, 23% of the patients observed to have ALT and AST level up to a bit. 43.7% of the patients had developed a pneumonia features in their X-rays.

Conclusions:

1. Patients hospitalized with measles in the NDDC were mainly 0-5 year-olds and infants up to 9 months old who are under the age of vaccinations. Infections transmitted from the hospital and health centers were major impacts on the measles contagion.

2. For the symptoms, fever, blistered rashes, cough and lost appetite were dominated in the patients and 53% of the patients have complications and suffered from lung pneumonia.

3. According to the test results, 43.7% of the patients were observed to have pneumonia features and 23% of them have transaminase level up to a bit and in the intensive stages of the disease, the cells number in patients’ general blood test increased considerably.
Clinical and epidemiological feature of measles mortality

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1NCCD, 2NPC, 3MNUMS

Background

In 2014, there were 114 900 measles deaths globally—about 314 deaths every day or 13 deaths every hour (WHO, 2016). Since March 2015 there was a measles epidemic started the and totally 23464 cases (72.9 per 10000 population) registered that year in Mongolia.

Objective

To investigate the clinical and epidemiological features of measles mortality registered within the first 3 months of 2016 in Mongolia.

Materials and method

We retrospectively studied 66 death cases by reviewing epidemiological, clinical and pathomorphological data of them. The complications were classified as the ICD10 (WHO, 2008). Data analysis made with Microsoft Excel programme.

Results

During the first 3 months of 2016 in Mongolia totally 15540 measles cases were registered and among them 66 deaths occurred. Mortality rate was 0.4% in nationwide and 0.3% in Ulaanbaatar. When considering sites of those 66 cases, 22 (33.33%) were in Ulaanbaatar, 11 (16.67%) in Selenge, 6 (9.09%) in Arkhangai, 5 (7.57%) in Khtentii, and in Darkhan-Uul and Bayabkhongor 4 (6.06%) cases separately, in Uvs, Khuvsgul and Khovd 3 (4.54%) cases separately, 2 (3.03%) in Orkhon, 1 (1.51%) in Zavkhan, Dornogobi and Central provinces. Among all, 37 (56.1%) were males. Most of them, 75.8% (n=50, average age 5.6±1.5), occurred among children under 8 months of age. And 13.6% (n=9, average age 9.2±1.59) was among children from 9 months to 1 year of age, and 1% (n=6, average age 2.4±1.6) was among children from 1 to 5 years of age. 80.3% (n=53) of them haven’t received measles vaccination, 3 (4.5%) cases had one dose of MMR and 9 (13.6%) were restricted from vaccination. There was an adult case (1.5%), who had a Waldenstrom macroglobulinemia (ICD-C88.0). His immunization anamnesis was unknown. Manifested anemia (39.7%), malnutrition (12.6%), loss of weight (28,6%), eczema (6,1%), failure immunity (14,3%), cerebral paralysis (4,8%) and in...
congenital heart diseases, bronchial dysplasia, microcephalia, hare lip (11.1%) were observed. With the diagnosis pneumonia and/or diarrhea before 30 days of rash manifestation, 49 (74.2%) cases were hospitalized at the II, III level hospital centers. Measles was suspected during the rash manifestation in 98.5% (65) of them, however, in 62 (98.4%) of them, Koplik’s spot wasn’t described in their patient’s history. Most cases (71.4%) were referred to the hospital with severe condition and their average number of days hospitalized was 6.6±5.0 days. There were 3 (4.7%) cases died within 24 hrs. Blood test result showed leukocytosis in 42.5% (n=20), hypoproteinemia in 31 (94%), hypoalbuminemia in 7 (28%), ALT level increase in 22 (51.1%) cases. In addition, average red cell sedimentation was 22.6±14 mm/h and thrombocyte count was 302.2±153.8. Low hemoglobin level detected in 43 (91.5%) cases. The pneumonia was manifested as a complication in 62 (93.9%) cases. There were also cases with bacterial meningitis (1.6%), diarrhea (3.2%) and pneumothorax (3.2%).

In the lung histology of 10 death cases, who were treated in ICU of NCCD, were determined diffuse alveolar damage in 5 (50%) cases, nectotizing pneumonia- 5(50%), interstitial pneumonia - 6(60%), viral inclusion body- 5(50,4%). The measles IgM was positive in 32(48,5%) cases of all death.

Conclusions:

1. The measles mortality, occurred registered within the first 3 months of 2016 in Mongolia, was dominated among the children until 8 months of age (75.8%, average age 5.6±1.5). The most of them (74.2%) were hospitalized at the II, III level hospital centers with the diagnosis of pneumonia and/or diarrhea 30 days prior to rash manifestation.

2. Most of death cases (98.5%) were suspected during the rash manifestation with severe condition (71.4%) and 32 (48.5%) cases were confirmed with measles IgM determination.

3. Main cause of the death was pneumonia (93.9%).
Result of setting priorities in communicable diseases surveillance

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Background

To strengthen early warning and response system for communicable diseases our country needs to determine priority of communicable diseases and improve surveillance of these diseases.

Goal

The main objective of this prioritization exercise is to make the best use of limited human and financial resources for communicable diseases of public health importance.

Materials and methods

Design: The Delphi method through workshop according to the guideline "WHO Setting priorities in communicable diseases surveillance" was used for the prioritization exercise. 35 specialists of surveillance and response for communicable diseases of MoSH, NCCD, NCZD, WHO Country office and Ulaanbaatar City Health Department were participated in the workshop.

Methodology: To provide detailed information for participants of the exercise preliminary list of 36 communicable diseases and disease fact sheets were prepared by steering team members before the prioritization exercise. Each communicable disease was discussed and evaluated by each participant using a predefined 5-step scale according to eight criteria such as present disease burden, reported outbreak due to the disease and scope, health gain opportunity through public health activities, international regulations or programmes for surveillance and control, potential threat, emergence and changing pattern, social and economic impact and public perception. Total scores for each disease by each participant were summed and ranked in "Microsoft Excel 2010" software and calculated the average score for each disease using the median score as well as score range and standard deviation.

Result

According to median score ranking of 36 listed communicable diseases, it was determined the need to strengthen surveillance and rightly allocate financial resource for communicable diseases including novel influenza virus infection, measles, human plague, meningococcal meningitis, seasonal influenza, viral hepatitis B and C, multidrug resistant bacterial infection and human anthrax.
Assessment of early warning and response for communicable diseases

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Background

To fulfill goals of early warning and response for communicable diseases outbreak, there is obvious need of continuous improvement of national surveillance system for infectious diseases. 10 years passed since surveillance guidelines was developed and approved based on surveillance system evaluation conducted last in 2005, so it is imminently requiring nowadays to conduct intersectorial joint assessment.

Goal

The assessment was conducted with goal to evaluate surveillance system of early warning and response, implementation of surveillance guidelines, sectors participation, establish direction of renewing legislation and develop recommendations.

Materials and methods

All level of surveillance system was involved based on principles of intersectorial joint participation. From surveillance units of all level, 50 surveillance units were identified for the assessment by geographic location using simple random sampling method. Based on preliminary study result, assessment questionnaire, questions to facilitate small group discussion were developed and SWOT method was used to collect data.

Findings

Surveillance units are converting information for suspected cases of infectious diseases into syndrome and reporting to the national level. EWAR 2.0 programme is used only in aimag, city health department and NCCD. Cases for Influenza, diarrhea, acute flaccid paralysis, vaccine preventable diseases are reporting in duplication. Doctors and health workers have no understanding about event based surveillance. Only 9.1% of health workers from family health centres received training on surveillance. Legal environment to regulate Intersectorial functions is not established. Joint response is taking only in case of emergency upon decision of administration.
Conclusion

To highlight, at national level surveillance of infectious diseases is conducting by suspected cases not by disease syndrome, there is no legal environment to regulate Intersectorial functions. Thus, we recommend to determine surveillance priorities, renew current surveillance procedures, connect information system to Hi-Info programme, review relevant orders and regulations, provide clinicians with training on surveillance, regularly conduct assessment and supportive supervision, establish legal environment for intersectorial functions. All these will eventually eliminate data duplication.
Molecular epidemiology of some blood borne infections among healthcare workers in Mongolia

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Background

Health care workers are exposed to biological, chemical, physical and psychosocial hazards in their workplaces. Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency viruses (HIV) are the most common pathogens of blood borne infection. However, there is limited information among health care workers and no nationwide survey has been conducted thus far in Mongolia.

Objective

This study aimed to determine some molecular epidemiological characteristics of HBV, HCV and HIV infections, evaluate occupational risk factors among professionals working in all levels of healthcare organizations in Mongolia.

Materials and methods

A nationwide cross-sectional survey was used with stratified multistage, random sampling from 4 geographical regions and the capital-city. A representative sample size was calculated. Personal, medical and professional information was collected using a standardized questionnaire. Serum samples
were tested for anti-HBs, HBsAg, anti-HBc, anti-HCV, anti-HIV by ELISA (3.0 Ortho-Clinical Diagnostics, Raritan, NJ). HDV-DNA and HCV-RNA detection and quantification were done by real time-PCR method (COBAS® AmpliPrep / COBAS® Taqman® HCV test, v1.0 and HBV test, v2.0).

Results

A total 1020 randomly selected healthcare workers were enrolled from 17 Soums of four provinces and capital-Ulaanbaatar city in the study. Among participants 36.9% (n=375), 41.7% (n=424) and 21.4% (n=217) were from primary, secondary and tertiary level of healthcare service, respectively. Out of these 25.9% (n=261) were doctors, 37.1% (n=378) were nurses, and the remaining were 19.9% (n=202) other staffs. The rates of seropositivity for anti-HBc, HBsAg, and anti-HCV were 68.2%, 7.6% and 21.9%, respectively. In addition, 0.7% (n=7) were co-infected with HBV and HCV. Among HBsAg-positive subjects 89.7% were positive for HBV-DNA whereas 4.0% out of HBsAg-negative but anti-HBs-positive subjects were positive for HBV-DNA. HCV-RNA was positive in 46.2% of anti-HCV-positive participants. No positive case of HIV was observed among healthcare workers. Multiple regression analysis demonstrated that surgical procedure, blood transfusion and working year at hospital were statistically significant risk factor for HBV and HCV infection.

Conclusions:

Among urban and rural healthcare workers 28.8% had single or co-infection of HBV and HCV, furthermore 89.7% and 46.2% were positive for HBV-DNA and HCV-RNA, respectively. Vaccine induced immunity and coverage of hepatitis B vaccination was insufficient among health care workers nationwide.

Treatment outcome of hepatitis C in Mongolia

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Background

As WHO reported there are 185 million people have HCV infection and annually 350,000 of them die due to HCC and liver cirrhosis. In Mongolia, previous studies shown that HCV prevalence is over 10% and 97%-98% of people with HCV infection have infected with genotype 1b. In addition,
Mongolia is on first place of HCC mortality rate per 100,000 population and this is eighth times higher than globally average rate. HCV prevalence among primary hepatic carcinoma patients is 35%-45%. Therefore, activities on reducing chronic infection prevalence of hepatitis viruses and preventing complications of hepatitis viral infections have been conducted in the country. One of them is availability of Harvoni treatment for HCV patients since December 2015.

**Goal**

To investigate Harvoni treatment effectiveness on HCV infection

**Materials and method**

We retrospectively analyzed patient monitoring records and patient registration forms for HCV patients who received Harvoni treatment at NCCD, provincial clinics and private clinics.

**Results:**

There were totally 4681 patients received Harvoni for HCV infection by September 2016. People who received treatment for less than 3 months were 31% and for longer than 3 months were 8%. Among them 91.9% have chronic hepatitis and first stage of liver cirrhosis and 8% have liver cirrhosis and carcinoma.

After 1 month of treatment, HCV RNA test result was negative for 98.9% of all Harvoni patients and for the rest 1.1% resulted in decrease of HCV RNA.

After 3 months of therapy, blood test result showed 100% recovery on transaminase level.

**Conclusions:**

1. Early viral response to the therapy is 98.9% and recovery on transaminase level is 100%.
2. Most common side effects are headache, nausea and fatigue.
Prevalence and risk factors for \textit{M.tuberculosis} infection in 9,137 Mongolian school children

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Introduction

Mongolia has one of the highest TB incidence rates in the Asia Pacific Region (170 per 100,000 population per year estimated in 2014). Schoolchildren are at high risk of acquiring \textit{M. tuberculosis} infection. However, the prevalence of \textit{M. tuberculosis} infection and risk factors for acquiring it have not previously been investigated in this setting.

Materials and methods

We screened children aged 6-13 years attending 15 schools in Ulaanbaatar, Mongolia, for \textit{M. tuberculosis} infection using a commercial Interferon-Gamma Release Assay (QuantiFERON-TB Gold in-tube assay, QFT-G). Information on risk factors for acquisition of Mtb infection was collected from study participants. Regression analysis was conducted to identify independent risk factors for QFT-G positivity.

Results

The QFT-G test was performed on a total of 9,137 participants from September 2015 to May 2016: of these, 908 (9.9%) had a positive result, 8,225 (90.0%) had a negative result and 4 (<0.1%) had an indeterminate result. QFT-positivity was independently associated with increasing age [relative risk (RR) associated with each additional year of age, 1.15, 95% confidence interval (CI)1.11 to 1.29)], exposure to cigarette smoke in the home [RR=1.21, 95% CI 1.07 to 1.36], presence of a case of active TB in the home [RR=4.01, 95% CI 3.45-4.67] and season of enrolment (Winter vs. Autumn, RR 1.18, 95% CI 1.00 to 1.40; Spring vs. Autumn, RR=1.30, 95% CI 1.09-1.54). Among the sub-set of 326 children with a history of household exposure to a case of active TB, QFT-G positivity was independently associated with increasing age (RR associated with each additional year of age 1.10, 95% CI 1.01 to 1.19) and number of index cases to whom they had been exposed (RR 1.72, 95% CI 1.37 to 2.17).

Conclusions:

The prevalence of \textit{M. tuberculosis} infection was 10%. Risk of infection was independently associated with household exposure to an infectious index case, increasing age, passive smoking and sampling in Winter or Spring.
The Analysis of Chest Radiology of the National Tuberculosis Prevalence Survey in Mongolia

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Background

The National Tuberculosis (TB) Programme in Mongolia conducted the first national TB prevalence survey. This survey consisted of phase 1, the urban survey in 2014, and phase 2, the rural survey in 2015. We evaluated the significance of chest radiography (CXR), one of the screening methods, to be applicable for further active case finding.

Materials and methods

All consenting participants with a positive screen on either symptom questionnaire and/or chest radiography (CXR) submitted sputum for smear and culture. We analyzed the radiological results with bacteriologically results as the reference standard.

Results

Of 50,309 eligible participants from 98 clusters, 9,546 participants provided at least one specimen. There were 248 bacteriologically confirmed pulmonary TB cases. CXR alone identified 238 (96.0%) cases with a corresponding sensitivity, specificity and positive predictive value of 97.1%, 84.5% and 3%, respectively. Symptomatic cases had more cavity and greater extent of shadow compared with asymptomatic cases (p<0.0001, p0.008). Of 80 smear positive cases, 62 (77.5%) had moderate to extensive lesions on CXR, in contrast, 85 (53.1%) cases of 160 smear negative culture positive cases had only limited lesions.

Conclusions:

CXR screening had high sensitivity, and combined symptom/CXR screening has an important role for TB suspect identification.
Prevalence of tuberculosis suspects and their healthcare-seeking behavior in Mongolia

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Background

Tuberculosis (TB) is a major public health concern in Mongolia. More than half of the population (53.9%) have unsufficient knowledge about TB.

Objective

To assess the health-seeking behavior of adults with prolonged cough.

Materials and methods

A population based, cross-sectional survey was conducted using stratified cluster sampling. Participants were interviewed for TB symptoms and their health seeking behavior. Participants with a cough lasting two weeks were classified as TB suspects.

Results

Of 50,309 survey participants, 5.1% had prolonged cough. Fifty-three percent of them had sought health care and reported pharmacies (17%), family group practitioners (56%), district health centers (13%), and private physicians (2%) as first point of contact. Only 20% received advice to undergo sputum smear examination. Of the TB suspects with prolonged cough, 2.0% were diagnosed with TB. The young adults, students, and individuals who were living in the city approached pharmacies for care more often than their rural counterparts. Preference for family clinics increased with age.

Conclusions:

In this survey, half of the TB suspects had visited a health-care provider. The health facilities most frequently contacted first were those of family practitioners. TB case detection need to be improved by retraining health staffs of family health facilities.
Introduction

Recent years, drug resistant TB increased due to treatment failure and interruption in our country. There is no declining trend observed on number of surgery among TB patients.

Objectives

To determine current situation of surgical operation and diagnostic confirmation of TB and MDR-TB cases hospitalized in National center for communicable diseases.

Results

Between 2013 and first half of 2016, total of 2166 cases underwent surgical operations and 97.1% (2105) of them were in TB clinic and 2.9% (61) were in clinic of infectious diseases. Out of surgery underwent in TB clinic, 39% (821) were for pulmonary tuberculosis, and 61% (1284) were for extrapulmonary TB. One hundred (4.8%) surgical operations done as an emergency procedure and operation on abdomen, pulmonary, pleural empyema were 59, 32, and 9, respectively. 10.8% percent of total patients underwent surgery was children. During study period, 113 (5.2%) cases repeated the surgical operation. Thirty one percent (35) of them with spinal TB, 22.1% (25) of them with fibrous cavernous TB, and 27.4% (31) of them with other diagnose. Out of all, TB diagnosis confirmed as 88.9% (1775) by histological examination after the surgical operation. 98.7% (2078) of all surgical samples were tested for sputum smear microscopy and culture. TB confirmed for 19.2% (399) of them by culture. Total of 206 (9.5%) multidrug resistant TB cases detected among all cases and 128 (62.1%) of them diagnosed after the surgical operation. Also 1 patient was diagnosed with XDR-TB.

Conclusions:

Histological examination playing important role for diagnostic confirmation of TB patients underwent surgical operation. Number of surgical operation for MDR-TB cases is increasing and infection control should be improved in TB clinic.
Seroprevalence of measles and rubella in mothers and newborn infants in Ulaanbaatar, Mongolia, in 2016

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Background

The surprise outbreak of measles in 2015-2016 in Mongolia after a long 14-year absence is challenging us to search possible reasons.

Goal

To identify current immunity level against measles and rubella among mothers and children.

Materials and methods

We conducted the study using cross-sectional study design at maternity hospitals (namely National health center for mother and child, Urguu, Amgalan, Khuree Maternity Homes) in Ulaanbaatar city between 20 Jan-30 March, 2016. We collected a questionnaires and bloods of 1067 mothers aged between 17-39 and 1067 of their infants. The blood was tested by ELISA kits (Enzygnost Anti Measles virus IgG, Enzygnost Anti Rubella virus IgG).

Result

Average age of mothers was 28.1±5.7. Measles specific IgG were detected in 89% of total enrolled mothers, 11% of them had no immunity against measles. Immunity level against Measles for new born infants was same as it in the mothers. Rubella IgG were detected in 93% of mothers and new born infants and 7% of them was seronegative.

Based on the study result, we conclude that 737 mothers and children in Ulaanbaatar have risk to be infected with measles and 469 mothers and children have risk to be infected with rubella virus.

In our study, we could not estimate that measles/rubella immunity was induced by measles infection or vaccine. In addition we could not estimate how long the passive immunity will protect the child.
Preliminary results for active tuberculosis case-finding among at high risk population

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Background

According to the mid-term external review of Mongolia’s National Stop TB Strategy conducted in 2013, there is an ongoing transmission of TB in the communities and the infection is concentrated among vulnerable population groups. Half of TB patients are unemployed, and 70 percent have income below sustainable livelihood level. According to the above conditions, Korean National Tuberculosis Association (KNTA), National Center for Communicable Diseases (NCCD) and Mongolian Anti-Tuberculosis Association (MATA) has signed an agreement of cooperation to implement "Korean-Mongolian Anti-TB collaboration project in Ulaanbaatar" in 2015-2017.

Goal

To detect early TB cases among target population groups, and to prevent the spread of the disease.

Material and methods

Probable TB cases will be identified using chest X-ray (CXR) and questionnaire survey. Participants with cough lasting at least 2 weeks or CXR abnormality should be classified as “probable TB case” and sent to sputum specimen collection station. A probable case should submit two sputum specimens (spot and morning). Smear microscopy and real-time PCR should be done on both spot and morning specimens. Culture and drug susceptibility testing (DST) should be done if necessary.

Results

Until September 2016, a total of 5488 people should be attended active case finding among the project target groups and notified 6 drug-resistant TB, 21 sensitive TB, totally 27 TB cases confirmed by microbiological tests. Detected TB cases should be enrolled to the treatment at TB dispensary of Chingeltei district.

Conclusions:

Active case finding result was high among vulnerable population groups and it is effective tool for preventing mortality of TB and also spread of the
disease. In the future more, need to expand such as active tuberculosis case finding among at high risk population.

Drug resistance detection in *M. Tuberculosis* strains isolated from urban participants of TB prevalence survey

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Background

According to the World Health Organization (WHO) report 9.6 million individuals suffered TB infection and 1.5 million individuals died of TB worldwide in 2014. The 4172 Of TB cases newly notified in Mongolia in 2014. Laboratory diagnosis of MDR-TB in Mongolia dates back to 2003. Since then 1726 MDR-TB cases have been diagnosed. Almost two-thirds (63.1 percent) of MDR-TB patients are notified in Ulaanbaatar. This study was aimed to determine the major mutations in INH and RIF resistant among isolates from urban participants of TB prevalence survey.

Materials and methods

Among isolates from urban participants of TB prevalence survey were tested for rifampicin and isoniazid resistance using the Geno Type ® MTBDRplus assay (LPA).

Results

A total of 149 culture positive cases from TB prevalence survey were included in this study. *M. Tuberculosis* was isolated in 94.0% (140/149) of cases and NTM in 9 cases. Of 140 *M. Tuberculosis* isolates subjected for LPA test, 1 had invalid results. Cases with NTM and invalid LPA results were excluded, leaving 139 TB cases for the final analysis. Of 139 isolates 74.8% (95% CI 67.5-82.0) fully susceptible, wild 4% (95% CI 4.5-14.2) and 15.7% (95% CI 9.6.-21.7) were MDR and INH mono-resistance. *katG* and *inhA* mutations were observed in 28.6%(10) and 71.4%(25) among 35 INH resistant isolates. The *katG*, *inhA* and *rpoB* mutations observed in these cases were S315T, C-15T, and S531L respectively. MDR was found in 24.3% (95% CI 16.4-32.1) and 29.2% (95% CI 11.0-47.3) among new and previously-treated cases, respectively (p>0.05).
Conclusions:

There was high prevalence of drug resistance TB among new and previously-treated cases. The most dominant gene mutations associated with resistance to INH and RIF were observed in codon C15T of the *inhA* gene and codon S531L of the *rpoB* gene in Urban.

**Key words:** *M.Tuberculosis*, Drug resistance gene mutation, Geno Type® MTBDRplus.

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**Drug resistance detection in *M.Tuberculosis* strains isolated from rural participants of TB prevalence survey**

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Introduction

Incorrect use of the drugs, treatment failures, and the transmission of MDR isolates have caused multidrug-resistant tuberculosis. Multidrug-resistant (MDR) *Mycobacterium tuberculosis* (TB) infection requires rapid detection/identification, and the molecular method will help the appropriate case management and infection control. This study aimed to determine drug resistance among isolates from prevalence survey.

Materials and methods

A total of 102 *M. tuberculosis complex* isolated from rural participants of national TB prevalence survey in 2015 were tested for Genotype® MDRTBplus(Ver.2 Hain lifescience GmbH, Germany) assay. State12 software used in data analysis and where appropriate, was determined by calculating 95% confidence intervals (95% CI).

Results

Of 102 isolates, 61.8% (95%CI 52.3-71.2) were fully susceptible, while 9.8% (95%CI 4.0-15.6), 16.6%(95%CI 9.3-23.8) and 11.8% (95%CI 5.5-11.8) were MDR, mono and poly-resistance, respectively. *katG* and *inhA* mutations were observed in 12 (41.4%) and 17 (58.6%) among 29 INH resistant isolates. The *katG*, *inhA* and *rpoB* mutations observed in these cases were S315T,
C-15T, and S531L, respectively. MDR was found in 9.6% (8/83) and 11.1% (2/18) among new and previously-treated cases, respectively.

Prevalence of drug resistant-TB were more occurred among new cases (28/84) than previously-retreated cases (11/18) and but is not statistically significant ($p=.07$).

**Conclusions:**

Prevalence of first line drug resistance was relatively high in both of new and previously-retreated cases. Resistance to isoniazid is predominantly associated with the mutation in $inhA$ gene and most dominant gene mutation associated with resistance to rifampicin was observed in codon 531 of the $rpoB$ gene. Further molecular epidemiological study will be required to analyze the route of transmission in the rural community.

**Key words:** GenoType ® MTBDRplus, isolated strains of $M.tuberculosis$ complex, drug resistance

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**Knowledge, Attitude and Practice analysis of Tuberculosis among Secondary school students, 2016, Mongolia**

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**Introduction**

From 2009, the programme to develop peer trainers to teach about preventing tuberculosis was implemented among secondary school students with the financial support of Global fund. For the programme, Ulaanbaatar (UB) city districts and provinces with high rate of tuberculosis were picked: 299 students from 15 schools in 6 districts and 396 students from 20 schools from provinces Darkhan-Uul, Tuv, Selenge, Khentii, Orkhon, Sukhbaatar, Dornogobi, Dornod, Khuvsgul, Bulgan, Arkhangai, Uvurkhangai, Bayankhongor, Zavkhan, Khovd,Uvs, Gobi-Sumber, Umnugobi, Dundgobi, Bayan-Ulgii were trained.

**Goal**

To study the knowledge, attitude and practice of tuberculosis among students from schools included and non-included in the project; to develop recommendation
Materials and methods

The evaluation used document study, qualitative and quantitative methods (individual and group interview). The sampling included 8-12 grades from 7 schools (urban and local) with peer trainers. The statistical data processing was conducted on SPSS version 21.

Results

The evaluation covered 2505 students from 7-12 grades in UB and in 4 provinces. The average age of study participants was 15±1.4, 49.5 percent were from UB city. The youngest participants were 12 and the oldest 18. Majority of the participants were girls from 8th grade, lives in their own home with 5-7 family members. Among the study participants, 56.3 percent have attended the project. 55.3 percent of the students have acquired information about TB at school and 76 percent knew TB was a respiratory infectious disease. 16.5% have no knowledge about how TB is transmitted and 8.6% have answered that TB is transmitted by household (dishes and towels). One in 4 children did not know about TB symptoms. 92.3% of the students have said everyone can be affected by TB and 74.5% have said a patient with TB should wear mask to prevent infection to others. 65.2% knew that TB can be cured and 54.8% said it can be treated in hospitals. One in 10 students believed TB is inherited. 81.5% had the correct knowledge that people who had TB can be infected again. Most students (statistically significant) knew that TB is a respiratory disease and is curable. The treatment is covered by the state and a man once infected with TB can be infected again. For the question “How would you feel if you were infected by TB?” 35.6% of students answered fear and 34.5% said that they would feel very difficult.

Majority of the students (62.1%) had the positive attitude to discuss with parents and health workers if they get infected by TB. 30.6% said they feel sorry for patients with TB but try to be far from them and 22.7% said they try to help. 15.6% of the students rated themselves as knowledgable about TB. 89.5% of the study participants think knowledge about TB is useful.

Conclusion:

From the evaluation, it can be seen that the programme was successful for preparing peer trainers. It is necessary to provide information about symptoms and treatment of TB and whether it is inherited or cured.

Key words: Tuberculosis, secondary school students, Mongolia
Social and psychological issues of the drug resistant MDR patients

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Introduction

Every year in world 8 million new cases of tuberculosis (TB) were diagnosed, and 2 million deaths occurred according by WHO. In next 10 years, 100 million new cases will be diagnosed and 20 million deaths will be occurred, if not activating to fight against TB. Mongolia is one of the most 7 high TB incidence countries among Western Pacific region’s 37 countries. In recent years, increasing drug-resistant TB is the urgent issue of the Mongolian health sector.

Materials and methods

Study design was cross sectional study. Selecting a sampling population included 95 cases of calculating by 95 percent confidence interval (1.96) and margin of error (0.07). Depression evaluated by Quick self test developed by Lenore Radloff. In addition, a psychometric assessment of anxiety (the Spielberger-Khanin test) was performed.

Results

87.4 percent of all participants had a depression and among the 16-44 aged group depression level was highest (82.2 percent) (p<0.05). Also, depression level was highest in the first 11 months of the treatment (54.7 percent in the first 0-6 months, 26.33 percent in the 7-11 months of the treatment) (p<0.02). There were anxiety level was highest in 89.5 percent of all participants and among the 16-44 aged group anxiety was highest (92.6 percent) (p>0.05). Considering by duration of the treatment, anxiety level was highest in the 0-6 months (55 percent) and 7-11 months (26 percent) group (first 11 months of treatment) (p<0.02).

Conclusions:

84.7 percent of all study participants had a depression, 89.5 percent had an anxiety. Also, drug-resistant TB patients responded by having a depression (45.3 percent) and anxiety (30.5 percent) when they are knowing their diagnosis.

Key words: Multi drug resistant, directly observed treatment strategy (DOTS), depress, anxiety
Comparison results of TB diagnostic laboratory methods

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Background

Early diagnosis of tuberculosis remains difficult, particularly in resource-limited settings. We aimed to evaluate the clinical efficiency of TB-LAMP (Eiken Co., Japan) for the diagnosis of active pulmonary tuberculosis.

Materials and methods

We performed head-to-head comparison of mycobacterial detection assays on sputum samples from 284 subjects presenting symptoms of presumed TB in the Ulaanbaatar city. Result of Ogawa was compared to smear microscopy, TB-LAMP and Genspecialist MTB/RIF for all samples.

Results

With 284 (100%) valuable tests, 197 (69.3%) were smear negative and 87 (30.6%) were smear positive. Compared to culture, sensitivity and specificity of each examination was as follows: smear examination; 70% (95% IC 60.8-77.8) and 98.2% (95% IC 94.3-99.5), Genspecialist MTB/RIF assay; 99.2% (95% IC 94.7-99.4) and 91.9% (95% IC 85.3-95.8), TB-LAMP; 91.9% (95% IC 85.3-95.8) and 96.3% (95% IC 91.6-98.4). In total, 124 (43.6%), 133 (46.8%) were MTB positive with smear examination, TB-LAMP and Genspecialist TB/RIF, respectively (p=0.499).

Conclusions

The TB-LAMP test showed high sensitivity and specificity for TB detection in TB suspects. There were no statistically significant difference observed for sensitivity and specificity between TB-LAMP and Genspecialist MTB/RIF tests.
Ensuring a healthy start to life: the importance of WASH in health facilities

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In 2015, 163,000 newborns died in the Western Pacific Region accounting for 50% of deaths in children under the age of 5. Fourteen percent of these deaths were from infections including sepsis, pneumonia, and tetanus, risk of which can be reduced through cleaner birthing environments.

Hygienic practices in facilities such as handwashing with soap, clean birth surfaces, and clean cord cutting can reduce neonatal deaths from sepsis by 27% and tetanus by 38%. As over 95% of births in the Western Pacific occur in health facilities, access to uncontaminated water, adequate sanitation and good hygiene practices in facilities is critical to preventing infection. Provision of basic water, sanitation and hygiene (WASH) services in health facilities remains low. Data from 54 countries worldwide show that 38% of health facilities do not provide access to an improved water source, 19% do not provide improved sanitation, and 35% have no soap available for handwashing. Assessments of newborn care in 27 national and regional hospitals and 9 primary facilities in the Western Pacific Region found that one in three facilities did not have functional toilets, and sinks with running water, soap and dry towels available in delivery rooms. Whilst the 9 primary facilities, all in Mongolia, had adequate sanitation and hand-washing facilities, assessments of hand hygiene among 35 staff in four hospitals in Ulaanbaatar revealed that only 17% had little or no contamination.

Improving WASH services in health facilities will require development and enforcement of national policies and standards, as well as systems for monitoring progress in achieving these standards. Complementing health facilities, adequate WASH services must also be provided in schools to prevent infections during childhood.
Water quality and safety of Ulaanbaatar city

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Background

The population of the capital city of Mongolia has been rapidly increasing in last two decades and reached 1.3 million as of 2015. The water supply and sewerage authority is responsible for providing the population with safe drinking water and disposing waste water in the capital city. The authority has 7 big water resources with 218 underground wells, 7 pumping stations, 16 reservoirs with pumps, 586 km distribution pipes, 320 water distribution kiosks connected to the centralized system, 294 transported water distribution kiosks and 58 water trucks. Ensuring water quality at all points in daily basis is a big challenge.

Goal

Review results of water quality tests which were done in the central water laboratory in 1995-2005 and conclude implementation progress of the water safety plan programme in the water supply and sewerage authority.

Materials and methods

In the period of 1995-2005 a total of 67200 water samples were taken from 950 points including underground wells, water reservoirs, pumping stations, water distribution kiosks, water trucks and water taps. Water samples were tested using bacteriological 5 indicators and 65 physical and chemical indictors in daily basis. The desk review of all documents of the water safety plan programme implementation was done.

Results

Total number of bacteria was on average 20-25, 5-10 and 30-35 in samples of water underground wells/pumping stations, reservoirs and water distribution kiosks respectively. But based on results of the repeated tests, intestinal pathogens including are not detected. For chemical indicators, there was not found any exceeding chemicals which has health concern in all samples of seven water resources. Mineralization and hardness meet the drinking water requirements of the national standard MNS 0900:2005.
Conclusions:

Water quality of drinking water resources meets the drinking water quality requirements of Mongolian national standard MNS0900:2005. On average total number of bacteria is less than the maximum permissible level and intestinal pathogens are not detected in all samples. It presents that drinking water is treated in proper way.

Effects of prenatal exposure to PCB, Dioxins and PFAAs on allergies and infectious diseases during infancy

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There is growing concern that widely existing POPs, such as PCB, Dioxins, and PFAAs (PerFluoro Alkyl Acids) or some commercially used products such as phthalates, can affect the child’s susceptibility to infections and the development of allergy and asthma through their potential immunosuppressive or modulatory properties. The fetal period is a critical window of immune system development and resulting heightened susceptibility to the adverse effects of environmental exposures.

We have been conducting two birth cohort studies (N=514 and N=20,938) in Hokkaido, Japan since 2002. The study suggests that prenatal exposure to Dioxins and some PFAAs through maternal blood can significantly increase the risk of infectious diseases during infancy with low IgE level in cord blood, while some of them decreased the symptoms of allergy but simultaneously increase infectious diseases at 1, 2 year and 4 years old following up. We could not find such adverse effects of prenatal exposure to phthalate and offspring’s allergic symptoms. However, in our cross-sectional studies on the nationwide indoor air pollution we found that developing allergy due to increased inhalation exposure to phthalates, especially among childhood. Policies to reduce exposure to these compounds should be advocated.
Quality, safety and hygienic assessment of drinking water of urban population

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Background

Supply of sufficient drinking water that meets drinking water quality requirements has become one of the most urgent problems of the global community, regions and nations. According to the hygiene requirements of drinking water, the composition of safe drinking water should be suitable for the human body, free of biological contaminants, and be sufficient for domestic as well as all requirements for living. The population density in urban cities are growing year by year, causing increases in environmental pollutants and risk factors. This has created increased needs for routine monitoring of negative impacts on human health.

Goal

To conduct chemical and microbiological testing of drinking water and provide findings and conclusions

Material and methods

A total of 21 provinces were involved in the analysis, where samples of drinking water from 881 groundwater wells of 299 soums were tested for arsenic, uranium, lead, fluoride, and iodine; water samples of 831 groundwater wells of 315 soums were tested for ammonia, nitrate, nitrite, water hardness, calcium, magnesium, and iron; and microbiological analysis was conducted in 1309 groundwater wells of 305 soums. The results and conclusions of the analysis were provided.

Results

The microbiological analyses detected E.Coli, the coliform bacterium in the water of 135 wells /10.3 percent of the surveyed/, while the amount of bacteria in the water of 220 wells /16.8 percent of the surveyed/ were found to be exceeding the maximum amounts specified in the standards. The chemical analyses detected the amounts of arsenic in 34 wells /3.8 percent/, uranium in 101 wells /11.5 percent/, lead in 29 wells /3.3 percent/, fluorine in 142 wells /16.1 percent/ respectively exceeding the maximum amounts specified in the standards. On the contrary, the fluorine content in the water of 408 wells /46.3 percent/ were lower than the minimum amounts specified in the standards. For hardness, the drinking water in 29 soums were categorized
as “very soft”, while the water was “soft” in 167 soums, “somewhat hard” in 106 soums and “hard” in 13 soums. In 89 wells of 52 soums, the magnesium content was higher than the maximum amounts specified in the standards, while in 139 wells of 86 soums the iron content was exceeding the maximum amounts specified in the standards.

Conclusions:

1. Among the 315 soums involved in the assessment, the water of 228 wells in 151 soums were disqualifying the standard chemical content / hardness, magnesium and iron/ requirements of drinking water.
2. The toxic chemical substance testing conducted on the drinking water of aimags and soums detected disqualifying amounts of arsenic concentration in 34 wells of 18 soums, uranium content in 101 wells of 54 soums and lead content in 29 wells of 24 soums.
3. According to the findings of the microbiological analysis, 3.4 percent of centralized water sources and 14.7 percent of decentralized water sources disqualify the standard requirements and bacterial contamination in the decentralized water resources is 4.3 times higher than the centralized sources.

Impact assessment and Auditing for Water Safety Plan

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Background

In 2012, Water Safety Plan(WSP) Development for the Water supply organizations has initiated in Mongolia. During this process WSP been implemented in National level. According to completion of the implementation of WSP programme in June 2016, there is a need to collect data and assess the impact and auditing for Water Safety Plan.

Goal

1. To collect data for WSP impact assessment
2. To audit the implementation of WSP.
Materials and method

In 2016, according to the guideline developed by the WHO, the data were collected from Watr Supply and Sewerage Authority (USUG), Chandman-Ilch LLC, Saikhandulaan, Altanshiree, Zamiin-Uud of Dornogobi province, and Bulgan, Tsogt-Ovoo, Nomgon soums of Umnugobi province, which have implemented the WSP.

Results

All the participating water supply organizations from Ulaanbaatar city, province and soums have appointed the water safety team, developed the WSP and have implemented the plan from 2012 to 2015. During the implementation of the WSP protection of the drinking water resource was improved, Water transportation truck supply was increased, some of the water pipes were renewed, and number of water kiosks were increased.

According to the results of the last 12 months’ water samples, the water USUG is distributing to the population has met the Drinking Water Quality standard. As for Dornogobi province, fluorine concentration in the drinking water increased, while drinking water of Nomgon soum had high total hardness. As for chlorination of the drinking water, organizations except USUG, Chandman-Ilch had no chlorination. Consumer based satisfaction survey on drinking water quality, sufficiency, and price has started in all organizations especially in USUG the survey has become regularly. WSP has been implemented at USUG four years. During this period, the WSP team was established in accordance with the WSP guidelines, the team developed water safety and investment plans and, thus, resolved problems of financing and maintained fairly stable and effective implementation of the WSP. In addition, the team has planned many future activities. Therefore, the USUG’s WSP was assessed as “very good”. As for the organizations of the province and soums, the water safety plan implementation has started few years ago, especially for soums the plan was implemented only a year ago, thus evaluation was impossible to conduct.

Conclusions:

Even though, Mongolia has been implementing Water safety plan 5 years ago, water associated policies have been approved and developments in water supplying infrastructure, investment, and activities have been recognized.
Hand-washing behavior among secondary school children, Mongolia

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Introduction

Keeping hands clean through improved hand hygiene is one of the most important steps we can take to avoid getting sick and spreading germs to others. Many diseases and conditions are spread by not washing hands with soap and clean, running water. CDC recommends cleaning hands in a specific way to avoid getting sick and spreading germs to others. About 1.8 million children under the age of 5 die each year from diarrheal diseases and pneumonia, the top two killers of young children around the world [WHO and UNICEF, 2012]. Handwashing with soap could protect about 1 out of every 3 young children who get sick with diarrhea [Ejemot RI at all, 2008] and almost 1 out of 5 young children with respiratory infections like pneumonia [Aiello AE at all, 2008]. Although people around the world clean their hands with water, very few use soap to wash their hands. Washing hands with soap removes germs much more effectively [Burton M, 2011]. Hand washing education and access to soap in schools can help improve attendance. Good hand washing early in life may help improve child development in some settings [Bowen A at all., 2012].

Goal

To assess schoolchildren’s hand washing behavior

Materials and methods

The Mongolia GSHS employed by using international standard methodology to produce a representative sample of all students who is studying public and private secondary school 12 and above years old in Mongolia and participated total 5393 in the survey. All schools from urban and rural areas were selected with probability proportional to school enrollment size and sampling frame involved to produce a representative of students in grades 7 or above. All prevalence estimates were computed with 95% CI.

Results

Overall, 42.4% of total students always and 32.3% usually wash their hands and there was comparable these percentages in GSHS, 2010 and 2013. Negative habit in male students (8.1% 95%CI 7.3-9.1) that they rarely/never washed their hands before eating meals during the last month was more
than female students (7.0% 95%CI 5.6-8.8). Total 5380 students answered the question whether they washing hands after using toilet and 41.1% of them said always, 27.4% usually wash their hands after using the toilet. This percentage increased by 1.4-3.5 points compared with previous survey 2010. Total 10.9% (95%CI 9.7-12.4) students rarely/never wash hands after using toilet. This percentage was in male 12.2% (95%CI 10.5-14.2) which is more than female (9.7% 95%CI 8.2-11.4) students. Differences were seen in the results on rarely/never wash hand after using toilet between age groups, for instance, 8.3% (95%CI 5.9-11.5) was in male students aged 12 years or younger and 12.3 percent (95%CI 10.0-15.0) in 13-15 years old, 13.8% (95%CI 10.5-17.8) in 16-17 years but there was no statistical significance. However, there was a statistically difference in habit on rarely/never wash hands after using toilet among schoolchildren in rural (13.2%, 95%CI 10.9-16.0) versus urban (8.6%, 95%CI 7.2-10.2). Encouragingly, 91.5% of participants always or usually use soap when washing their hands and differences were not seen in this category between sexes. More than half of the students or 56.5 percent (95%CI 53.6-59.4) never or rarely washed their hands before eating meals at school during the past month. Hand-washing habit before eating meals at school no quite better compared to previous survey. Additionally, this study was assessed the availability of toilets and sinks at school. Disturbingly, 4.7% responded that there were no toilets or sinks at school and 27.8% responded that there are not enough toilets or sinks at school. Overall, 70.8% (95%CI 66.5-74.8) of students responded that there were enough toilets and sinks. In total, 43.0% (95%CI 38.0-48.1) of students never/rare drink water, tea etc at school. The percentage of female (46.6% 95%CI: 45.1-51.8) students was by 7.7 points more than male (38.9% 95%CI: 33.6-44.6).

**Conclusions:** There was a negative habit on students never/rare wash hands eat meal or drink tea at school and before eat meal. In total, 10.9 percent of students never/rare wash hands after use toilet and there was a statistically significant difference in this indicator in rural versus urban settings.

**Key words:** hand wash, behaviour, school children, Mongolia
Assessment of knowledge, attitude and practice of infection prevention and control among doctors

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Introduction

The prevalence of hospital-acquired infections (HAI) is mainly associated with non-compliance practice of preventive and control mechanisms related to infections among health professionals. In Mongolia a one-day prevalence study was completed at two third-level hospitals in 2008 and about 50 patients out of 933 patients were identified with HAI (5.4%). Approximately 3.9% of the HAI was registered for surgical related performances and it makes a 1.1% of total HAI incidences.

Goal

To assess the knowledge, attitude and practice of infection prevention and control among doctors.

Materials and methods

A cross-sectional and observational study was based on a hospital setting and the qualitative and quantitative methods for data collection were employed. Data were analysed using SPSS 20.

Results

The study involved 325 doctors working at various institutions specialised centres and aimag, district’s General Hospitals. The knowledge of infection prevention and control was assessed by a 20-score method and the following figure presents the results. The average score was 9.19 (SD=2.80) for all participants, whereas 8.91 (SD=2.77) for second level employees, 9.63 (SD=2.80) for tertiary level employees and the difference was statistically significant. Reasons associated with not complying with hand washing practices was identified as work overload (21.9-32.8%) and continuing performance without washing hands in between. Participants indicated the need for more hand washing basin in every cabinet (56.3-68.8), provision of hot water (61.8%-75%), provision of antibacterial soap (59.4%-83,6%), supply of motor-sensitive water (51,7%-73,4%).
Conclusions:

The average score of knowledge among participating doctors was 9.19 (45.9%), urban doctors scored a lower result when compared with rural doctors. When analysing the specialties, laboratory doctors scored the highest result with 9.88, and the gynaecologists had the lowest score with 8.36. A positive attitude related with prevention and control of HAIs was observed from participating doctors. The practice of prevention and control of HAI was average.

**Key words:** hospital-acquired, infection, knowledge, attitude, practice, doctors, Mongolia

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**Staphylococcus Aureus food poisoning among election commission officials**

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*Surveillance department of NCCD*

**Background**

At 19:58 pm, June 28, 2016 the officials of Election commission, reported to the Infectious diseases surveillance and control department of NCCD about occurrence about diarrhea and vomiting. We investigated to identify the agent and source to response.

**Materials and methods**

A case which canteen supplied buuz (Mongolian traditional steamed dumpling filled with meat) under the contract caused symptoms of acute diarrhea and vomit as a “suspected case”. “Suspected” and laboratory confirmed are defined as a “confirmed case”. We sent specimens of rectal swab and vomit sample for laboratory testing. We conducted a descriptive and retrospective cohort study and attack rate, relative risk and p-value were calculated. We collected the information using combined (face to face and phone call) interview. Election official were divided into three parts and 119 volunteers were working. 81 of them (68.1%) as well as 4 employees of the canteen were investigated. 57 (67.1%) were bacteriology tested.

**Results**

85 cases were involved in the research and overall attack was 83.1%. Incubation period was about 6-7 hours and there was a point source outbreak.
43 (50%) participants were aged 15-44, median age 40.9 as well as 68.2% were females. Comparing participants with people who did not eat the buuz, relative risk was 6.8 times more (p-0.000). 64 percent of all cases had clinical symptom. 75.5% were abdominal cramp and the same percent had diarrhea, 68.8% nausea and 66 percent had a headache. Staphylococcus aureus was isolated from the vomit for 5.3 percent.

Conclusions:

The outbreak was due to food poisoning and was caused by the S.aureus in accordance with the surveillance, clinical symptom laboratory tests. We recommended the canteen to buy a fridge or to have a cellar, to be supplied with safe food and to organize regular (in every six months) medical examination for the canteen employees.

Clinical and generator type, and antibiotic sensitivity of intestinal infectious diseases

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General hospital Bulgan Province

Goal

Our study purpose is to evaluate differential diagnosis and treatment for Intestinal infectious diseases.

Material and methods

74 patients disease history for Intestinal infectious diseases between 2008-2012 in General hospital of Bulgan province

Result

Total admissions 74 clients 57/77%/ detection of fecal forming bacteriological analyzed, and 11/19% / case no growth of the bacteria. The cultured bacteria is 15/26% / citrobacteri, 9/16% / enterbacteri, 9/16% / shigella, 5/9% / proteus, 4/7% / E.Coli, 3/5% / klebsella, and 1/2% / salmonella. The antibiotic sensitivity evaluated of microbiological bacteria sensitivity ampicillini 2,3%, penicillini 4,3%, erythromycini 27,6%, chlorampenicoli 55,2%, gentomycini 80,6%, cephazolini 81,6%, ciprofloxacini 81,8%, and cephataximi 94,4%.
How to investigate food-borne outbreak in children’s organizations: based on food-borne outbreak occurred in a school on Oct 2015

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Introduction

There are frequent occurrences of food-borne outbreaks in schools in Mongolia. Team investigated to verify the outbreak, and identify its magnitude and the source following children’s presentation to hospital with gastrointestinal illness.

Methods

A suspected case was defined any student, teacher and other employee of school X who had two or more stool a day after having food at the school cafeteria between 7 October and 9 October, 2015. We interviewed children, teachers and parents to collect data on age, sex, grade, signs, symptom onset and foods consumed at school cafeteria in 7-9 October 2015. Logistic regression analysis of food exposures was done to identify potential association with illness.

Results

Children from grade 1–5 were affected with illness (AR = 48.9% (167/341). No significant difference in sex identified. Common symptoms were diarrhea (100%), fever (76%), headache (51.5%), vomiting (47%), appetite loss (39%), thirst (36%), dizziness (31.2%) and sweating (24%). Four children were hospitalized. Yogurt had highest significant association with the illness (RR=2.9; 95%CI: 1.4-5.9; p=0.0003). Eighteen samples were positive for Shigella flexneri, including 15 children, two teachers and one cook. E.Coli H7 was positive in two samples from the children.

Discussion

We verified food-borne disease outbreak at school X affected younger children ages 6-10 years. Yogurt was likely source of this outbreak. This outbreak investigation provided an opportunity to recommend implementation of daily monitoring of food handling practices along with educating school managers and staff on safe and healthy food concept at schools.
Hand washing at the school settings

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Introduction

Poor hygiene practices and inadequate sanitary conditions play major roles in the increased burden of communicable diseases within developing countries. The main purpose of this survey is to determine practices on hand washing influence among selected schools children in Ulaanbaatar.

Materials and methods

This cross-sectional study was conducted among the 48th and 65th school children located in ger and apartment area of UB. The data was collected from school children (N=449) aged 9-13 years who were interviewed by trained staff. All data were analyzed by SPSS 21.0.

Result

In total 449 school children were surveyed and 50.1% of them were girls. Overall, 78.2% of school children live in ger area and 21.8% of them live in apartment. 51.6% of respondents said that they did not wash their hand regular at the school, 14.3% of them use soap while washing hand and only 34.1% use just water. 9.8% ($x^2=26.3$, $p>0.000$) of children of school #48 and 11.5% ($x^2= 25.8$, $p>0.004$) of school children school #65 were reported that they did not wash their hand at school because of no water at the school bathroom. The percentage of children who had heard about hand washing was high among the 48th (71.9%) school children than the 65th (58.1%) school by 13.8%. The main reason of not washing hand at the school #48 was were no presence a “Soap” at the school. According reasons not use soap for washing hand at school, 67.2% of students of 65th school and 63.9% of students of 48th school were reported that there are no soap at school bathroom.

Conclusion

The majority of surveyed school children do not wash hand because of no water and no soap at the school bathroom. There are need to supply proper soap and water at school bathrooms in both school.

Key Words: hand washing, soap, school children
Improving the quality of a drinking water: Use of the Nano Filter

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2Department of Public Health, Health Center of Khuvsgul province

Introduction

The alimentation is very important thing for pupil, another important thing is water. Water is much more important than drinking milk and fruit juice. We must give our children clean and healthy water according to their ages. The standard of the education before school must focus on water and sanitary norms, including the fact that 2-5 year aged children should drink 0.5-1.0 liter of fresh water every day.

Goal

The modern technology of cleaning water is developing. Therefore, we need to research the quality of the distillation with Nano technology for our aimag’s condition, considering about the interest of the pupil.

Materials and methods

- In our Murun sum, one kindergarden uses the Nano filter. It is 6.6%, This kindergarden generates 0.5-1.0 liter pure water for 15 pupils every day. This is 5 and 33%.

  In a parents’ survey given in September 2015: 145 children (83.8 %) were thirsty. After 6 months (0.5-1.0 liter fresh water of the Nano technology), only 4 children were thirsty (2.3%). This shows a decrease of 81.5%
  In 2015, Toothache dispersal was 43.4%, the twist was 4.1.
  In 2016, 42.5% and the twist-4.2. Because children were drinking pure water every day, the pure water aided in preventing tooth cavity.

- Improving habit of drinking water of the children 2-5 : in 2015- Sep-21.4%-in 2016-100% when comparing filtered water by Nano and unfiltered water it was found that there was no taste, no smell, better water pressure and not muddy. The stomach of the children were also healthier.

  When took sample of water by Nano the water’s color, taste, smell and muddiness were the same with the water of MHG. When comparing other natural water’s structures by taking a sample of water by Nano, we monitored mud of snow water which was 40 jtu, PH-8, c pp4 and the Delgermoron river mud of water which was PH-7.3, boiled water 2-3 times mud of water
100 JTU, PH 9, boiled water 2-3 times is not enough to fulfill the requirement because the oxygen content was 4 ppm.

**Results**

Improved safety of a drinking water from the information found on the water indicator. Water distilled with Nano technology is soft, pure and bright. There is no bacteria found, and water was rich in minerals.

**Conclusions:**

We can always use water distilled with Nano technology for our daily use. If we use filtered water accordingly, all our lives will be very healthy and we will teach good habit of drinking water for our young generation.

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**Risk of sharp waste infections among employees of a hazardous waste disposal company in Mongolia, 2015**

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**Background**

Research stages II, III, including 621 medical workers and needles and sharps exposure prevalence was 38.4% in Mongolia¹. Decrease future health care workers concluded that the risk of a needle or sharp tip follow the preventive measures.

We conducted a study to

1. To determine the sharp waste exposure levels among employees in this company;
2. To determine risk factors to sharp wastes; and
3. Develop recommendations to reduce the sharp wastes exposure at such settings.

**Materials and methods**

We conducted a cross section survey for data collection. We invited the staff who were working for the company between 2012-2015 to participate in this study.
Results

Sharp injuries were associated with waste reception room, or waste activities carried out in the interim is 21.6-35.1%. 31.9% of the affected people in waste packaging, release and safe box junk diaphragm, 25% of waste loading, unloading, and 15.3% were exposed to during the crushing of the waste. Less than 19 years old workers more affected RR=4.1 (CI=1.1-17.9). High risk worker who is no education group then other groups. RR=1.8 CI (1.0-3.3).

Conclusions:

Sharp points or edges waste exposure was 35.6%. The average work year of 1.9 and average exposure frequency of 3. The risk than other employees who Avtoklav assistant, washer is 2.4 times higher.
BIOGRAPHY OF SPEAKERS

TSOGTSETSEG Ayush

MD, PhD
Cabinet member, Mongolian Minister of Health
Clinical professor, Consultant doctor

Dr. Tsogtsetseg Ayush has graduated the therapeutic class at Medical University in 1986. She has appointed as a general physician at the National Dermatology Center and worked as the director for 14 years. Since July 29 2016, she has been appointed as the Minister of Health.

In 2009, Dr. Tsogtsetseg has held doctoral degree in dermatology at the Central Institute of Dermatovenorology, Moscow, Russia in 2009.

Dr. Tsogtsetseg has published 5 volumes of the book “Cutaneous condition” and about 30 research articles and presentations in international and domestic journals. She has introduced 80 standards of diagnostics and treatment of dermatology into practice. In 2015 Dr. Tsogtsetseg has developed guideline to implement quality management system ISO9001:2010 into health sector and made the National Dermatology Center “the national model hospital”.

Prof. Pagbajabyn NYMADAWA

MD, PhD, DSc(Med)
Member of Mongolian Academy of Sciences, and Mongolian Academy of Medical Sciences

Medical doctor graduated from the Medical Faculty, Mongolian National Medical University (1971). Obtained his PhD degree on medical virology from Medical Faculty, Humboldt University, Berlin (1977) and DSc(Med) degree on medical virology and epidemiology from D.I.Ivanovsky Institute of Virology, Russian Academy of Medical Sciences, Moscow, Russian Federation (1989).


Prof.P.Nymadawa has more than 900 publications in Mongolian, English, Russian and German including 25 books and more than 110 articles in peer-
reviewed international journals. 90 his publications have been registered in GoogleScholar Search Engine with 2330 citations resulting h-index=19, i10-index=29 (by Oct.2, 2016). 491 sequences were registered in GenBank (nuccore) on Prof.P.Nymadawa's name (by Oct. 2, 2016).


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Dr. MARK JACOBS
Director, Communicable Diseases
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Dr Mark Jacobs is Director, Communicable Diseases for WHO’s Western Pacific Region. He oversees teams helping the 37 countries and areas of the region tackle a wide range of important communicable diseases, such as malaria, tuberculosis, HIV, vaccine-preventable diseases, hepatitis, STIs, vector-borne diseases and neglected tropical diseases.

Dr Jacobs took up this role in 2013. Prior to that he has had a series of senior public health leadership roles: most recently he was New Zealand’s Director of Public Health from 2004-2013. Before that he managed the Public Health Programme at the Secretariat of the Pacific Community, and earlier had important public health roles at state and regional levels in Australia.

He has qualifications in Medicine, Public Health and Health Services Management, and his interests include developing healthy public policy, strengthening disease surveillance, strengthening all hazards emergency preparedness, and working across sectors to improve health.
Dr. SOE Nyunt-U

MD, M.Sc., PhD
WHO Representative of Mongolia

Dr. Soe Nyunt-U has been working as WHO Representative in Mongolia from November, 2012. Prior to his appointment as WR of Mongolia, Dr Soe Nyunt-U was a WHO Representative to Philippines (2007-2012). A national of Myanmar, he started in 2000 as a short-term professional consultant and later on a scientist for situational policy and analysis at WHO Western Pacific Regional Office. In 2002, he was appointed as an Acting Director and eventually as Director for Health Sector Development Division (2003-2007).

He finished his Doctorate of Medicines in Yangon Myanmar, took up his Master of Science in Health Planning and Financing at the London School of Economics and Political Sciences at the University of London in United Kingdom. He served as Medical officer in charge at the Kyauk Tan Township Co-operative Clinic. Dr. Soe was also UNV Medical Director of the United Nations Development Programme assigned in Sierra Leone. He also served as lecturer of the Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya.

Dr. ANTHONY Eshofonie

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Dr. Anthony Eshofonie is an Epidemiologist with the Emerging Disease Surveillance and Response (ESR) unit in the World Health Organization Regional Office for the Western Pacific (WPRO) in Manila, Philippines. In this capacity, he coordinates inter-country alert and response networks within the Western Pacific Region, provides technical assistance in the planning, implementation and analysis of epidemiological studies and works with national authorities in identifying gaps for epidemiological training needs at national level. Dr. Eshofonie joined WHO in 2014 as Medical
Officer for Pandemic Preparedness and in charge of Epidemic Readiness and Intervention, at the WHO Regional Office for Africa (AFRO). In this role, he coordinated the AFRO’s preparedness and response to epidemic and pandemic prone diseases. Notable achievements include in-depth engagement and coordination of the preparedness and response plans for countries at risk in the Region during the West African Ebola Virus Disease outbreak.

Before joining WHO, he worked as an Epidemiologist for the Texas Department of State Health Services and the City of Houston Health Department in Houston, Texas primarily focused on communicable diseases epidemiology and public health emergency response.

He is a Medical Doctor by training and subsequently completed postgraduate training in Hematology and Blood Transfusion, and a Master’s Degree in Public Health (MPH) from the School of Postgraduate Studies at the University of Lagos, Nigeria. He also completed research fellowship training at the Medical Research Council (MRC) Laboratories in The Gambia focusing on the immunology of the Human Immunodeficiency Virus. He has published several papers in peer-reviewed journals covering HIV/AIDS, infectious disease epidemiology and emergency preparedness and response.

NARANGEREL Dorj

MD, MPH
Head of Department of Emergency Management,
Ministry of Health of Mongolia

Dr. Narangerel was graduated from Mongolian National University of Medical Sciences as a medical doctor. She started her job career as a principal doctor of the small province of Mongolia. She has work experiences in the communicable diseases and public health departments of Mongolian National University of Medical sciences, National Center of Communicable diseases and Ministry of Health. She have developed 5 law drafts, around 150 orders, regulations and guidelines, and still now providing technical management for the sustainable implementations of those laws and regulations. She organized the nationwide introduction of vaccines of Rubeola-Measles-Mumps and Hepatitis A vaccination. Dr. Narangerel have participated in 8 research works of communicable diseases and vaccination, and published 8 research papers in international scientific journals. She earned her master degree by “Management of Public health” at the Kebangsaan University of Malaysia.
MINA Nakauchi
PhD
Senior Researcher in Influenza Virus Research Center,
National Institute of Infectious Diseases, Japan.

Dr. M Nakauchi got her PhD degree at Division of Biological Sciences, Graduate School of Science, Hokkaido University. After 5 years of postdoctoral fellow in Hokkaido University and National Institute of Infectious Diseases, she started research on influenza viruses in National Institute of Infectious Diseases from 2009.

She developed genotyping method for detecting neuraminidase inhibitor-resistant A/H1N1pdm09 virus using real-time RT-PCR. The method have been used for nationwide monitoring for the antiviral susceptibility of influenza viruses in Japan since 2010.

Her research interests are development of point of care testing system for the respiratory tract viral infection using molecular diagnostic techniques.

KIM MULHOLLAND
MBBS, FRACP, MD, Professorial Fellow
Group Leader, Murdoch Childrens Research Institute

Kim Mulholland is an Australian pediatrician, trained at Melbourne University and the Royal Children’s Hospital, Melbourne. With post-graduate training in immunology, respiratory medicine and tropical medicine he joined the Medical Research Council Laboratories in 1989, where he developed a programme of research covering all aspects of the problem of childhood pneumonia. This included studies of the aetiology, clinical signs, and treatment of pneumonia cases, with particular reference to very young infants and malnourished children. These studies guided WHO policy in the field and contributed to the development of the strategy of Integrated Management of Childhood Illness (IMCI), as well as guiding oxygen and antibiotic management for hospitalized children. His Hib vaccine trials were the first to demonstrate the capacity of conjugate vaccines to prevent bacterial pneumonia, and paved the way for Hib vaccine introduction in Africa. After six years in the Gambia he joined WHO where he oversaw the development of standardized methods for the evaluation of pneumonia...
vaccines in developing countries. Since leaving WHO in 2000 he has continued to work in the pneumonia field with particular emphasis on vaccines. He was one of the founders of the Global Action Plan for Pneumonia, and one of the leaders of the successful Hib Initiative project that saw the introduction of Hib vaccines into the poorest countries of the world. During the same period he established leading pneumococcal microbiology and immunology laboratories at the Murdoch Childrens Research Institute (MCRI), Melbourne, along with major field research programmes in Vietnam, Fiji and Mongolia, and growing programmes in Indonesia and Laos. He currently holds professorial appointments at the MCRI in Melbourne and the London School of Hygiene and Tropical Medicine in UK.

**URANTSETSEG Shagdar**

*Master of Management Science*

*Officer in charge of Environmental Health and Chemical Safety Policy Implementation Coordination, Ministry of Health*

Ms Sh.Urantsetseg graduated from National Medical University in 1998 as a Hygienist and Epidemiologist. She used to work as a researcher at the Public Health Institute, 1998-2000, and a senior state inspector of hygiene and infection control at the department of health, education, culture and science of General Agency for Specialized Inspection in 2000-2012. Since 2012 she has been working as an officer in charge of Environmental Health and Chemical Safety Policy Implementation Coordination, Ministry of Health. She attended a specialized training on “Food Safety” and an advanced course on “Specialist for Food Hygiene” respectively in 2003 and 2004 at the National Medical University. She defended her Master of Management Science at the Academy of Management, Implementing Agency of Mongolian Government with the master degree of management science. She developed a number standards such as “Essential Environmental Health Standard in Health Care Facilities, MNS 6392:2013”, “Requirements on internet cafés and PC game centers MNS 6430:2014”, “Pit latrine and sewage pit technical requirements MNS 5924:2015”, “Air quality”, General technical requirement MNS 4585:2016” In 2013-2016 she had worked as a secretary for the technical working group committed to develop “Law on Hygiene” and the law was endorsed on 04 February 2016.
NICK WALSH

WHO Western Pacific Region

Dr. Nick WALSH has worked as the focal point for viral hepatitis at the WHO Regional Office for the Western Pacific in Manila, Philippines since 2014. He drives the development of the Regional Action Plan for Viral Hepatitis in the Western Pacific 2016 – 2020, which was endorsed in 2015 and as well hepatitis disease burden estimates and economic analyses in a number of countries in the Region, among other activities over the past year. He is an Australian clinician with Public Health and Addiction Medicine qualifications through the Royal Australasian College of Physicians. He holds a PhD in epidemiology from Monash University. Over the past 10 years he has participated in the development of a number of global and regional WHO guidelines on hepatitis, HIV and substance use as well as supporting the development of National guidelines across the region — the most recent of these was the updated WHO Global hepatitis C treatment guidelines released in 2016.

TUGSDELGER Sovd

Head of Department of Monitoring, evaluation and internal auditing, Ministry of Health

Tugsdelger S. has graduated the National University of Medical Science and held master’s degree in public health at New York University. She has held her doctor’s degree at the University of Basel, Switzerland. Currently, she works as the head of Department of Monitoring, evaluation and internal auditing, Ministry of Health.

Tugsdelger has worked as the principal investigator in 8 studies and published 11 books and manuals, 11 articles in international and national journals.

At present, she is working as the principal investigator on “The study to determine the prevalence of tuberculosis in Mongolian population (2014-2015)”.
BAZARRAGCHAA Tsogt

MD., MSc., PhD
STREAM clinical trial, National Centre of Communicable Diseases; Mongolian Tuberculosis Coalition
bazra.ts@outlook.com

Bazarragchaa Tsogt graduated from the Mongolian Medical University with a bachelor (BSc) in medicine and started working at the Public Health Institute (PHI) of Mongolia as research associate in charge of reproductive health research. During her work at PHI, she was responsible for several major projects, including nationwide assessment of abortion and reproductive health services supported by WHO and Soros foundation. As a result of this work, the outpatient unit at the Maternal and Child Research Centre established a model unit to provide a woman-centered, comprehensive abortion and reproductive health services. Moreover, she worked on the epidemiological randomized controlled trial of London School of Hygiene and Tropical Medicine to investigate traditional swaddling practices in relation to pneumonia for young babies. In 2003-2004, she received a full DAAD scholarship from the German government and successfully obtained her masters (MSc) degree from Heidelberg University. Her thesis was related to the public-private partnership of tuberculosis care and services in developing countries. In 2008 she was awarded her PhD on infants’ thermoregulation in relation to swaddling practice in Mongolia from the University of the West of England in Bristol, UK. She also worked as a research consultant at Marie Stops International and Alfalmex, a company, specialized in medical technology transfer to developing countries in the UK.

As a member of the Tsahim Urtuu Kholboo, an NGO, which connects the Mongolians living abroad, and a board member of the Mongolian Association of the UK, since 2007 she has worked as a Programme chair for the last five years of the organizing committee of the annual “Mongolia Development Forum” held in London. She has also managed a Global Fund supported HIV/STI prevention project among the Mongolian community in the UK.

Since the end of 2013, she is working as a STREAM clinical trial coordinator, an international collaboration between the MRC CTU University College London, NCCD and MTC. This is the first clinical trial in the field of infectious diseases in Mongolia and the trial coordination and progress show that the capacity building to undertake future clinical trials at the international level within the NCCD is being established.
BINDERYA Ganzorig

MS, Head of Microbiology and Molecular biology laboratory, Gyals medical center, Mongolia

Binderya.G is graduated from MIU (Mongolia International University) with biotechnology major and started her work career at MIU as teaching assistant. She completed her master’s degree with full scholarship of ILWOO foundation from Korea and defended her master’s thesis on research titled “Studies on the role of cytoplasmic N-terminal of Epithin/PRSS14”, conducted at Cellular and Molecular Immunology laboratory of Inha University, Korea. She started to work as Head of Microbiology and Molecularbiology laboratory at “Gyals” Medical Center since 2014. She had participated in “7th Annual GABRIEL Meeting” organized by Merieux Foundation, held in France and was selected as one of five best young scientists with her research “Human Papillomavirus (HPV) prevalence and probability of unknown or rare HPV subtypes in Mongolia”. Also she led her team successfully to participate in the ‘Global HPV Proficiency Study’ programme organized by World Health Organization (WHO) in Sweden and “Gyals” Medical Center became the first laboratory to be regarded as proficient in typing HPV in Mongolia.

She is currently working on introducing a new molecular technology and tests in the laboratory and her research on the probability of unknown or rare HPV subtypes in Mongolia is ongoing.

BASIL DONOVAN

MD
Professor and Head
Sexual Health Programme The Kirby Institute

Professor Donovan is the Head of the Sexual Health Programme at the Kirby Institute, UNSW Australia, in Sydney. He also practises at the Sydney Sexual Health Centre. His research and policy interests include clinical, laboratory, and public health aspects of HIV and STIs; and priority populations such as gay men, youth, sex workers, Aboriginal people, prisoners and travellers. He is on the Board of Directors (President 2013-2015) of the International Society for STD Research.
Since it began, Prof Donovan has been involved in evaluating the Australian human papillomavirus (HPV) vaccination programme, and he is a technical advisor the Australian Government on HPV vaccination.

ENKHTUYA Jargalsaikhan

PhD (Vet.)
Senior researcher,
Laboratory quality manager at the Institute of Veterinary Medicine

Dr. Enkhtuya defended her Ph.D. in veterinary Science, from Gifu University Japan in 2007, by “Study on Anthrax Vaccine Development by Inactivated Spores”. She has studied on detection of *B. anthracis* specific spore surface protein and its role on molecule mechanism and lethal effect, developing safe and effective new generation vaccine against anthrax. She has specialized on following skills: nucleic acid manipulation (routine cloning, PCR, sequencing, isolation and purification of DNA and RNA, *in vitro* transcription, Northern or Southern blotting), production and purification of recombinant proteins using bacterial system, chromatographic technique, structural and functional analysis of protein. Immunoprecipitation, binding assays, enzyme activity assays, SDS-PAGE, Western blotting, cell culture technique ELISA techniques and animal injection by pathogenic bacteria. Most recently, she was involved in setting up zoonoses coordination mechanism, cross-sectoral laboratory network, human and animal Anthrax mapping study and hands-on laboratory skill training for aimag rapid response team.

Within the technical requirements of MNS ISO/IEC 17043:2007, has been leading the evaluation of the performance of laboratories for specific tests or measurements and monitoring laboratories for continuing performance and laboratory in-service training.
SETSEN Zayasaikhan

MD, HIV clinician
AIDS/STI Surveillance and Research Department
National Center for Communicable Disease,
Master’s student of Mongolian National University of Medical Sciences

Z. Setsen graduated from School of Medicine of the Health Sciences University of Mongolia and given a professional title of Medical Doctor and Bachelor Degree. After graduation, she specialized in STI and HIV/AIDS diagnosis, treatment and care service and is working for the HIV/AIDS Unit of AIDS/STI Surveillance and Research Department of the National Center for Communicable Disease for 4 years. She was given a specialty on HIV/AIDS by HIV training programme at AIDS Clinical Center of the National Center for Global Health and Medicine in Tokyo, Japan. Since April of 2016, she is doing Master course at the Mongolian National University of Medical Sciences. She is author and co-author of 7 publications and has presented at 6 international conferences and workshops. Her research interests are prevalence of STIs, HIV and hepatitis viral infection, and molecular epidemiology of HIV-1 infection.

ENKHTUR Yadamsuren

Associate Professor, MD, PhD
Consultant Dermatologists
Chairman, Department of Dermatology, School of Medicine, MNUMS

Assoc.Prof. Enkhtur Yadamsuren is Chairman, Department of Dermatology of the Mongolian National University of Medical Sciences. He has completed Ph.D dissertation in DermatoVenerology, in Novosibirsk State Medical University (NSMU), Russia in 2009. Currently he is Editor in Chief leading Mongolian Journal of Clinical Dermatology and Mongolian Journal of Dermatology, is President of Mongolian Society of Investigative Dermatology and Chief Advisor of Dermatology Ministry of Health of Mongolia.

He has published more than 126 research papers and 20 of them published internationally; have made 29 presentations in varied conferences. Successfully coordinated and delivered international and 4 national research projects in Mongolia.
ERDENETUNGALAG Enkhbat  

*Epidemiologist at AIDS/STI Surveillance and Research Department,  
National Center for Communicable Diseases*

Erdenetungalag.E graduated from the School of Public Health, Mongolian National University of Medical Sciences with a Bachelor Degree and professional title of Hygienist and Epidemiologist. She is currently studying in the Mongolian Field Epidemiology Training Programme. She has worked on the “Socio-economics situation of migrants and their access to and needs for social services” supported by the Government of Japan, “Mass media programme on prevention for HIV/AIDS” supported by the Global Fund implemented in Mongolia, “KAP survey among youth aged 15-24 on prevention of HIV/AIDS/STIs”,  
“Survey on determining methods of delivering health information among urban population aged 15-64” and “STI, HIV Surveillance survey” in 2011 and 2014. Since 2013 she has worked at the AIDS/STI Surveillance and Research Department, National Center for Communicable Disease as an Epidemiologist.

Jugderjav Badrakh  

*MD*  
*Head of STI treatment and care service unit of NCCD*

Dr. Jugderjav B. graduated Medical University and gained the title of Medical Doctor. She earned Master Degree in microbiology. Now she is doing doctoral degree course at the Mongolian National University of Medical Sciences. After graduation she completed residencies of dermatologist and AIDS, STIs doctor. She has completed STI and HIV training for specialized doctors at Infectious Disease Institute, Bangkok, Thailand and at AIDS Clinical Center of National Center for Global Health and Medicine, Tokyo, Japan. She has been working on STI and HIV field for 12 years. She is author and co-author of 18 presentations, 2 articles and 4 of her works were published on international publications. In addition, she has been working on developing guidelines, handbooks on sexually transmitted infection diagnosis, treatment and care service. She is author to 9 diagnosis, treatment standards.
NARANTSETSEG Vandandorj

Senior lecturer MNUMS, School of Medicine, Department of Infectious diseases

Dr. V. Narantsetseg was graduated Mongolian National Medical University in 1984. She then worked as dermatologist and STI doctor at the National Center for Dermatology and Venerology, Ulaanbaatar, Mongolia. Since 1991 she has been working as a senior lecturer in Infectious Disease Department of School of Medicine of the Mongolian National University of Medical Sciences. She has been participating research conferences, experience sharing meetings in Russia, Korea, Myanmar, Sweden, Switzerland, Philippines and Thailand.

Dr. Narantsetseg is author and co-author to about 20 textbook, guidelines and 30 research presentations and articles.

SODBAYAR Demberelsuren

Technical officer in charge for Expanded Programme on Immunization, WHO Country Representative office in Mongolia

Dr. (Ms) D. Sodbayar got Master degree on Medical Bacteriology with thesis on “Dissemination of microorganisms’ in newborn infants who has been delivered in maternity hospitals” in 2002 after graduation from Mongolia’s Medical University as an epidemiologist and hygienist in 2000.

She has graduated from the International post-graduate training course on Biotechnology with UNESCO support in Sendai and Osaka Universities of Japan during 2002-2003.

Dr Sodbayar has contributed for the National Immunization Programme Implementation, establishment of Early Warning and Response System (EWAR) in Mongolia, initiating of local fellowship courses in the area of Communicable Diseases, Development of Influenza Surveillance Network and proposal development of laboratory component for sentinel surveillance for pneumococcal surveillance in the country while working at the national level of the Communicable Diseases epidemiology of Mongolia.

She published over ten research articles on medical microbiology and infectious diseases’ epidemiology out of which five articles were published in
the international journals. Currently, Dr. D.Sodbayar has working as a Technical officer in charge for Expanded Programme on Immunization in WHO Country Representative office in Mongolia since 2008.

Tomimasa Sunagawa

M.D., Ph.D.
Chief
Division of Surveillance and Information
Infectious Disease Surveillance Center (IDSC)
National Institute of Infectious Diseases (NIID)

Dr. Tomimasa Sunagawa is a medical doctor who received a Ph. D. in medical science from Osaka University, Japan, in 1998. After completion of the Field Epidemiology Training Programme (FETP)-Japan, in 2001, he had been working as a senior researcher at IDSC/NIID, Japan. From 2004 to 2007, he had been dispatched to WHO/HQ in Switzerland and had international experience on Emerging Infectious Diseases and Vaccine-Preventable Diseases including poliomyelitis and measles. Since Apr 2013 to date, he has been working as a division chief for Surveillance and Information at IDSC, as one of the responsible persons to monitor the epidemic trends of whole the infectious diseases listed on the Infectious Disease Control Law in Japan.

In Japan, he is one of the members of National Verification Committee for Measles Elimination since 2014 up to now. He also devotes himself as a leader to research on Congenital Rubella Syndrome nationwide. Food poisoning is also one of his major responsible research topics.
NYAMKHUU Dulmaa
Ph.D, Associate Professor
General Director, National Center for Communicable Diseases

Dr. Nyamkhuu entered into the Nurse College of UB in 1983 and graduated from it as a nurse. In 1986 he entered into The Medical University of Mongolia and graduated from the university as hygienist and epidemiologist in 1991. During 1991-2006 he worked at Surveillance Department for HIV/AIDS of National Center for Communicable Diseases as Head of Department. Since 2007, he has been working as General Director of National Center for Communicable Diseases.

He successfully defended his PhD degree on “Hepatitis B vaccine coverage and some findings among urban and rural people of Mongolia” in 2006. Also he became a clinical professor in 2010, an associate professor in 2012 separately.

He developed some projects including introduction of Penta vaccine into EPI programme and Maintenance of EPI activities in Mongolia with WHO advisors and EPI team of Mongolia. Since 2006, these projects had introduced into the EPI programme step by step, finally Penta vaccine entered into the National schedule of routine immunization of Mongolia in 2009. Due to introduced new vaccine into National schedule incidence and mortality of Influenza B type meningitis among 5 years children decreased. It was main cause of mortality among 5 years children.

Also he developed some project on Safety injection strategy and Preparedness of SARS. The Asian Development Bank supported these projects. As result of providing preparedness of SARS Mongolia we had low loss.

NARANCHIMEG Jamiyanjamts
MD, MPH,
NCD contractor, WHO Mongolia

She has fifteen years of experiences in children’s health, project/survey coordination, public health in areas of community health education, sexual and reproductive health, human behavior, health promotion, and medical ethics; and participated around 20 survey/studies.
TSETSEGDARY Gombodorj

MD, PhD,
Public health specialist in New Public Health Association, Mongolia

Dr. G. Tsetsegdary graduated from the State Medical institute, Ulaanbaatar, Mongolia and was working as a physician, head of ENT department of State Central Clinical Hospital and lecturer of Mongolian Medical University.

In 1986-1989 she studied for doctoral course at the National University of Mongolia and successfully defended her PhD degree on “Diagnostic and Treatment of Disorder, Tubae Auditiva in Otitis Chronica Media” in 1990.

Dr. Tsetsegdary is a well known professional who has devoted more than 20 years her professional career working as an officer, team leader and head of division in charge of health promotion, mental health, injuries and other noncommunicable diseases in the Ministry of Health.

Dr. Tsetsegdary is author and co-author of 29 scientific papers in clinical subject and 60 papers in public health, 89 papers in totally and 4 scientific papers published in Russia, USA and England.

Sergey HANHAREEV

MD, PhD
The Chief state sanitary doctor of the Republic of Buryatia

Sergey Hanhareev has been doing much work on protecting health of the people of the Republic of Buryatia and preventing them from the spread of communicable and parasitic diseases, as well as massive non-communicable diseases (poisoning). Under his leadership, in order to provide sanitary protection of the territory of the Russian Federation, the sanitary-quarantine control is conducted at checkpoints across the state border of the Russian Federation. Over the past 3 years, under his leadership around 15 bylaws have been developed and adopted to address issues of protecting health of the population and maintaining sanitary and epidemiological well-being, such as the prevention of communicable diseases, improvement of supply of the safe
drinking water to the people, improving food quality and safety and sanitary conditions of cities and settlements of the republic. Sergey Hanhareev is the author of over 30 scientific articles and 2 monographs including “Nutrition and health of schoolchildren of the Republic of Buryatia” (2012) and “Health of students: priority factors and ways of prevention” (2016). He’s the Honored health worker of the Russian Federation.

Dr. SHI GUOQING

MPH
Director, the Chinese Field Epidemiology Training Programme (CFETP), Chinese Center for Disease Control and Prevention

Dr. Shi Guoqing graduated from the Anhu medical university in China got his bachelor degree. After graduation he started working in Department for control and prevention of acute infectious diseases, Anhui Provincial Center for Diseases Control and Prevention. He received his MPH in China CDC. Then worked at China Field Epidemiology Training Programme (CFETP).

Dr. Shi is author and co-author of 14 scientific papers published in peer-reviewed international journals. He received Award for contributions to disaster response from Bureau of Health, personnel of Anhui provincial Government, for contribution to public health from Ministry of Health and Ministry of Personnel of China, from Health Bureau, Personnel Bureau of Anhui provincial Government, Wuyang award in 2014 and for outstanding work in fighting against Ebola in 2015.

NARANBAT Tsedendorj

Health Department of Uvs aimag
Epidemiologist

Mrs.Naranbat worked at Uvs inspection agency and Border inspection agency through 2002-2013, as inspector in charge of hygiene worked in and epidemiology.

She graduated from Medical University of Mongolia in 2002. In 2015-2016 completed the MFETP programme as FETP trainee.

She have conducted studies on “Measles outbreak among health care workers in Mongolia in March-July”, “Assessing level of health awareness of Uvs population before and after a health intervention”.

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NYAMBAYAR Batbayar

*PhD*

*Director of the Wildlife science and conservation center of Mongolia*

He is one of the leading wildlife specialists in the country specializing on animal ecology in particular on avian species. His research interests include ecological research, understanding the role of wildlife and birds in infectious disease outbreak and transportation of disease agents across larger geographical region, modelling species distribution and animal movement. Nyambayar Batbayar has many years of research experience in wildlife ecology and biology in Mongolia. He travelled most of Mongolia in the last 20 years and have led implementation of several international projects. He travelled to Russia, China, and USA on research projects. He was the leading scientist from Mongolia on a FAO funded research project to study avian influenza virus prevalence and field surveillance project in Mongolia. In addition, he was the leading researcher from Mongolia on a multinational project to study the role of migratory birds in the spread of avian influenza virus along the East Asian migratory bird flyway partnering with the FAO, US Department of Agriculture, US Geological Survey, and University of Bangor in UK, University of British Columbia in Canada, and the University of Oklahoma in USA. During his PhD study at the University of Oklahoma in USA, he participated in a National Institute of Health and National Science Foundation funded multiagency research project to model spatial distribution of HPAI virus prevalence and hot spots in southeast and east Asia.

Purevdulam Lkhagvajav

*MSc, Entomologist*

*National Center for Zoonotic Diseases*

L.Purevdulam graduated the School of sciences of the National University of Mongolia (NUM), got bachelor degree by an ecology and conservation biology. She defended her MSc degree successfully by research named “The Distribution of mosquitos in some regions of Mongolia” at the NUM when she’s working by entomologist at the National Center for Zoonotic Diseases.

She had published some scientific papers by research of plague, tick-borne and mosquito-borne diseases to Mongolian and International Conferences.
Nowadays she is studying the research of tick borne encephalitis at the National Center for Communicable Diseases, Mongolian Field Epidemiology Training Programme.

ALTANTSETSEG Dorjpurev

Laboratory manager, NCCD

Dr. Altantsetseg has graduated from the Medical University in 1983 as a medical doctor. She has defended her PhD degree in 2013 with a dissertation named “Common serotypes of bacterial meningitis among young children”.

She has submitted 26 articles in various pediatric and infectious disease related journals which 8 of them had been published in internationally recognized journals. She has prepared 36 presentations in various conferences and presented her research findings. Moreover, she identified nucleotide sequence of 6 cultures of N. meningitis and registered it into genebank at CDC.

She also contributed reducing morbidity and mortality of under 5 children in Mongolia by participating in research works done to introduce Penta vaccine into routine vaccination. She is participating in the research to identify serotypes of S. pneumonia among children with bacterial pneumonia and meningitis.

BAIGALMAA Jantsansengee

MD, MMS
Head of Department of Field Epidemiology Training, National Center for Communicable Diseases
Ministry of Health, Ulaanbaatar, Mongolia
baigalmaaj@gmail.com

Dr. Baigalmaa is the graduate and of National Medical University of Mongolia and currently works as the Head of Field Epidemiology Training Department, National Center for Communicable Diseases, Mongolia. Dr Baigalmaa is an epidemiologist with specialistise in communicable disease epidemiology and field epidemiology. She was involved in and supervised more than 100 studies of Mongolian field epidemiology training graduates that included outbreak investigation, surveillance data analysis/evaluation and
risk assessment in 2011-2016. In addition, she had worked as the principal investigator of several studies that involved STIs and other infectious diseases. Dr. Baigalmaa is author and co-author of 22 scientific papers published in peer-reviewed international and national journals. She also has experience in editorial and peer-review activities and conducted abstract review for TEPHINET scientific conferences in several occasions in 2012-2016 and manuscript review for WHO WPSAR peer-reviewed journal. Her research interest is infectious diseases particularly related to IPC.

OYUNGEREL Darmaa

MPH, Epidemiologist
National Influenza Center,
National Center of Communicable Diseases

Mrs D.Oyungerel graduated from School of Public Health, Mongolian National University of Medical Sciences as a Hygienist/Public health researcher in 2010. After graduation she joined the Early Warning and Response Unit, National Center of Communicable Diseases as an epidemiologist. She received Taiwanese scholarship studied in master course at Asian University of Taiwan and successfully defended her MPH degree on “Perceived Body Weight Among School-Aged Adolescents In Mongolia” in 2015. Since 2015 Mrs. Oyungerel works at the National Influenza surveillance division as an epidemiologist in charge of nationwide influenza surveillance activities.

In July, 2016 she attended the workshop “WHO Annual Burden of Influenza Disease Meeting” in Geneva and presented “Influenza Burden of Disease Estimates in Mongolia during 2014/2015 season”. Mrs.Oyungerel is co-author of 3 papers published in domestic journal.
ENKHTUVSHIN Shiilegdamba

DVM, MPVM
Director, Mongolian Wildlife Conservation Society

1984-1994 graduated from the special language school #23, 1994-1999 obtained Doctor of Veterinary Medicine degree from the School of Veterinary Medicine and Biotechnology of the State Agriculture University.

2001 December through 2002 April went to 14 States of the USA on veterinary small and mixed animal internship through CVM.

2002-2004 graduated from the Masters of Preventive Veterinary Medicine and Epidemiology Programme from the University of California in Davis, USA. 2004-2007 Post-Doctoral researcher at the Western Institute for Food Safety and Security at the University of California in Davis, USA. In 2007 started working at WCS Mongolia Programme as a veterinary and wildlife epidemiologist and from 2013 working as WCS Mongolia director. She is leading projects on Foot and Mouth disease research, Avian Influenza surveillance in wild migratory birds. Also directing and advising for the extracting industry projects such as Core biodiversity monitoring in Southern Gobi region and Sustainable and wildlife friendly cashmere projects. Enkhtuvshin has over 20 years of experience in agricultural and veterinary field and over the past 10 years worked in the environmental field implementing and coordinating activities related to the livestock, wildlife and human health and interface disease issues, wildlife poaching and trade, community based natural resource management targeting on rare and critical species such as Wild ass, saiga antelopes, goitered and Mongolian gazelle. Authored and co-authored peer reviewed scientific papers on wildlife and livestock interface disease issues and surveillance with science based recommendations and presented at International conferences and meetings. She also works closely with the MOEGDT, MORT on wildlife migration barrier issues which are uprising. She has organized high level decision making and policy support workshops and meetings at local and National level on livestock wildlife disease and management issues, promoted environmentally and wildlife friendly disease management activities, supported core biodiversity conservation and protection in the Eastern Steppe and Southern Gobi regions.
Taro Kamigaki
MD, PhD, Assistant Professor  
Department of Virology  
Tohoku University Graduate School of Medicine

Dr. Taro Kamigaki graduated from Tohoku University, Sendai, Japan got his MD degree in 2001. After finishing his internship for surgery and residency for anesthesiology, he joined Field Epidemiology Training Programme at National Institute of Infectious Diseases, Tokyo, Japan. He then pursues his PhD degree at Tohoku University Graduate School of Medicine. He worked as guest researcher at US Centers for Disease Control and Prevention, USA and Imperial Collage London, UK. 

Dr. Kamigaki is author and co-author of 42 scientific papers published in peer-reviewed international journals and 26 review papers in Japanese in infectious disease epidemiology field especially influenza and other respiratory viruses. Dr. Kamigaki worked several times in WHO as a short term consultant or temporary advisor. He also is a member of International Meeting of Influenza Disease Burden Study held in WHO, Geneva.

His research interests are transmissibility of respiratory viruses, influenza disease burden and infectious disease modeling.

MUNKHNASAN Myagmarjav
Programme Manager, FIRE

Dr. Munkhnasan graduated with a bachelor degree in medical doctor from the Mongolian National University of Medical Sciences in 2004 and qualified for doctor of Dermatology and Venereology.

She worked as an emergency doctor at the Emergency Medical Service Center of Ulaanbaatar City and as a physician doing voluntary counseling and testing for sexually transmitted diseases at the Songinokhairkhan District Health Center. Prior to joining FIRE, Dr. Munkhnasan served as Programme Coordinator for the National AIDS Foundation in Mongolia, supervising the design, development, implementation, reporting, and monitoring and evaluation on community based programmes. She serves the same roles at FIRE. Now she is pursuing a master’s degree in epidemiology and biostatistics.
SARUUL Bat-Ulzii

MD, PhD, Clinical Professor
Consultant doctor of communicable disease

Dr. Saruul was graduated from Medical Science University of Mongolia in 1994 and started working as an Infectious disease specialist since 1996. Then, she earned her master degree in 1998. She has studied at Post Graduate Study Institution at Irkutsk, Russian Federation, between 2005 to 2009. After that, she has successfully earned her doctoral degree in 2010 with her study on Epidemiological and clinical characteristics of Erysipelas.

In 2014, she earned a professional title as a consultant doctor and also professor degree. She is author of 14 research articles and her 2 work were published on international journals. She is now working as a Head of the Outpatient Department of NCCD.

BATBAYAR Ochirbat

MD, MPH
batbayar@transparency.mn

Dr. Batbayar strives to accomplish a professional goal of mobilizing intellectual resources to improve the public health and tuberculosis of populations, using strategic research to inform better programme design and implementation. He is ex Director of National Tuberculosis programme and present project manager of Mongolian Health Initiative NGO.

He is graduate of London School of Hygiene and tropical Medicine.

He is currently working as a project manager Harvard funded project Vitamin D in TB prevention of School children.

With over 15 years of work experience in research and programmes to address TB particularly in low- and middle-income countries.
YASUNORI ICHIMURA

MD, PhD
Staff, Department of Control and Treatment of Infectious Diseases/Respirology, Graduate School of Medicine/University Hospital, Chiba University, Japan

Dr. Yasunori Ichimura graduated from Chiba University, School of Medicine in Chiba, Japan. After graduation, he started his medical activity as chest physician in International Medical Center of Japan. He studied in doctoral course in Chiba University, Graduate School of Medicine and successfully defended his PhD degree on “Factors predicting the effects of pirfenidone on idiopathic pulmonary fibrosis” in 2015.

Dr. Ichimura has supported the national tuberculosis prevalence surveys mainly as WHO short-term technical consultants and temporary advisor, after his experience as WHO volunteer (HQ, EMRO) in 2009. He has provided technical assistance for the first national prevalence survey in Mongolia conducted in 2014-2015, from the preparation stage to the analysis and reporting stage.

TSOLMON Boldoo

Epidemiologist in Tuberculosis Surveillance and Research Department, National Center for Communicable Diseases

B.Tsolmon is working as epidemiologist in Tuberculosis (TB) Surveillance and Research Department at National Center for Communicable after graduation of Health Sciences University of Mongolia as medical doctor and Field Epidemiology Training Programme as epidemiologist.

While working as epidemiologist, he conducted 12 operational studies and 3 assessments for TB diseases and 6 scientific papers published in peer-reviewed international journals.

Currently, he working as assistant coordinator responsible for data management and analysis for “First national TB prevalence survey in Mongolia” 2014-2015, and “Third national drug resistance surveillance study” 2016. And he is responsible for implementing paper and web based the TB surveillance system in the department.
PRIYA MANNAVA
Technical Officer, Information and Accountability
Reproductive, Maternal, Newborn, Child and Adolescent Health
World Health Organization Western Pacific Regional Office

Ms. Priya Mannava is a public health professional with experience working in reproductive, maternal, newborn, child and adolescent health (RMNCAH), HIV/AIDS, and health systems. She currently works as Technical Officer for Information and Accountability in the RMNCAH Unit, in the WHO Western Pacific Regional Office in Manila. In this role, she supports countries in the region to strengthen their information systems for and undertake research in RMNCAH. Prior to assuming this role in 2014, Priya worked with UNAIDS in Viet Nam, the Burnet Institute and University of Melbourne in Australia, and with the Global Fund to Fight AIDS, Tuberculosis and Malaria in Switzerland. Priya has a Masters in Global Health Science from the University of Oxford.

BATSUKH Baljinnyam
Vice Director and Chief Engineer of Water Supply and Sewerage Authority of Ulaanbaatar, State Consulting engineer

Mr B.Batsukh graduated from the Technical College in Kemerovo, Russia (1987-1991), and the Mongolian University of Science and Technology (1997-2000) as an Engineer of water supply and sewerage works. Since 1992 he has been working in the Water Supply and Sewerage Authority of Ulaanbaatar. Mr B.Batsukh got Master degree in 2003, and he became a State consulting engineer of water supply and sewerage works in 2012. He was technically qualified by the training programmes in Japan, Korea, Germany and Holland.
Reiko Kishi has been a Professor and the head of Department of Public Health, Hokkaido University School of Medicine, Sapporo Japan since 1997. Currently Prof. Kishi is the principal investigator of two large-scale community-based birth cohort studies, which have been conducted since 2002, focusing on how and to what extent low level environmental chemicals affect child fetal development, hormone and child developmental disorders, including gene-environment interaction. Recently Prof. Kishi and, two principal investigators in Asia, established the Asian Consortium of Birth-Cohort studies, BiCCA, with an aim of enhancing the quality of new studies in Asia and other continents. In addition to the above, She has done a variety of studies on environmental and occupational health: 1. Experimental toxicological studies in the early 1970 to the end of the 1980s, 2. Studies of workers exposed to organic solvents, methyl bromide and mercury vapor., 3. Occupational Cancer, 4. Studies on Occupational stress and Physical and Mental Health of Workers, 5. Nationwide epidemiological study on indoor air quality and sick building syndrome, 6. Social support & networks and preventive care of the elderly. As a result of long-term scientific contributions, especially in the field of environmental & occupational epidemiology, she has received honors from several scientific associations. Prof. Kishi has been a member of Science Council of Japan since 2005. She has served as a Chairperson of Food Hygiene Council of Japan Committee Ministry of Health, Labor and Welfare, Japan since 2005. Prof. Kishi has been a fellow member of the Collegium Ramazzini since 2013.
BAYASGALAN Batbayar

Master of Medicine
Senior State Inspector of Hygiene and Infection control,
Division of Health Monitoring, General Agency for Specialized Inspection

She has been working as a bacteriologist and senior state inspector of environmental hygiene since her graduation from the National Medical University in 1989. In her working experience, she established a bacteriological laboratory in the Inspection sector of Hygiene and epidemiology of Bayangol district and introduced a testing methods. She has great contribution to informing decision makers with inspection reports of water quality, solid and liquid waste management, soil and air pollution and their proper decisions further improvement while she was working in the Municipal Professional Inspection agency as well as General agency for Specialized Inspection. Using her inspection data she has presented about 10 scientific presentations such as “Hygienic assessment of water quality and safety of urban settings”, “Soil hygiene of urban areas”, and “Study findings of air pollution impact on health in big cities” in scientific conferences and meetings including national professional forums. In order to improve legal framework hygienic inspections, she has taken a part of the thematic working groups and made her professional contribution to endorsing the Law on Hygiene, Mongolian National standard of essential environmental standard for Health care facilities MNS 6392:2013, Mongolian National standard of Air Quality MNS 4585:2016.

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Dr. Erdenechimeg has worked at the PHI as a researcher and senior researcher in 1996-2006, and in 2006-2012, as a senior lecturer and chair of Department of Preventive Medicine, in 2014-2016, as a chair of Department of Environmental Health, MNUMS. Her research results were published at more than 120 journals and conference books for abstracts in Mongolian and English. Recently, she has been working on Exposure to Arsenic and Uranium from Groundwater in Gobi area and project on Water Safety Plan in Mongolia.