

Brief Report of the Covid 19 Campaign Run by National Innovation Center (Rastriya Awiskar Kendra) to Help Mitigate the Spread of Corona Virus in Nepal Until April 25, 2020

The government of Nepal announced nationwide lock down on March 24, 2020 to minimize the spread of Coronavirus across the country. Before that they had postponed all the international flights coming to Nepal. Soon after the announcement of lockdown was done, the National Innovation Center started receiving calls from doctors of different hospitals such as Bir Hospital, Teaching Hospital, BP Koirala Institute of Health Science and others for help to create, develop and manufacture things that can help to mitigate the spread of Coronavirus. Those calls triggered the ideas of getting involved to help mitigate Coronavirus outbreak in Nepal

First, we looked for the materials in the market that can be used to make gown for the PPE (Personal Protective Equipment). We found that a material called Rubberized Taffeta Fabric is good for the gown because it is waterproof and can be reused after putting it several times in an autoclave for disinfection. We made a couple of sample PPE gowns and showed them to different doctors. Those doctors told that those gowns are very good and will be much more protective for the doctors than having nothing. After we got some more suggestions from the doctors for the improvement, we redesigned the gown and started producing them. Those gowns have been made fully air proof and waterproof. Other than producing and distributing gowns, we are developing and distributing several other things as follows to help hospitals and communities across the nation.

1. Manufacture and distributions of PPEs to Hospitals - So far National Innovation Center has distributed more than 5,200 PPE gowns to more than 225 Hospitals, Primary Health Care Centers, Corona Isolation Centers, and Corona Testing Hospitals of 56 districts of 7 provinces of Nepal. The local governments are sending their vehicles to the National Innovation Center to get PPEs and other items. Depending upon the size of the hospital, we are distributing 25 to 30 PPs to big hospitals, 15 to 20 PPEs to medium size hospitals, 10 to 15 PPEs to Primary Health Centers/Corona Treatment Centers and around 5 PPEs to small health clinics in the villages. People are coming at the center to pick up the PPEs and other items.



PPE Set



PPE set being prepared for distribution

2. Distribution of PPEs to Ambulance Drivers, Security Personnel and hospital staff - Because of the huge demand of PPEs from ambulance drivers, security personnel working at Nepal India Borders, Emergency Rescue Squad of Police, hospital personnel such as nurses, junior doctors, interns, cleaning staff working at the hospitals and security guards, we have so far distributed more than 850 PPE gowns, gloves and surgical masks to them.
3. Manufacture and Distribution of Corona Booth – From the Internet, we learned that hospitals in South Korea are building booths to keep the doctors and Corona patients separate safely while collecting swabs from the patients. We redesigned the booth based upon the materials that were available and asked engineers in different parts of Nepal to build it for the hospitals where they treat Corona patients and collect swab for testing. So far 20 such booths have been distributed to hospitals in different parts of Nepal. More booths are being built because there is more demand.



Corona Booth

4. Manufacture and Distribution of Aerosol Box – We have developed a simple box made from transparent acrylic sheet, which is good for protecting the doctors from the sneeze of patients, while they are treating the patients. It has been named aerosol box and we found in the Internet that hospitals in other countries are using similar boxes. We have distributed 22 of those boxes to different hospitals.



Aerosol Box

5. Repair work of broken ventilators of different hospitals – National Innovation Center received requests from several hospitals for help to repair their broken ventilators and medical equipment. We created a team of volunteers of biomedical engineers and sent them to different hospitals. We found that there were 85 broken ventilators in different hospitals. 40 ventilators have been repaired so far and the hospitals can use them. The biomedical volunteers are trying to fix others as well despite it being difficult to get spare parts. Also three broken Kidney Dialysis machines have been repaired. There are other broken medical equipment at the hospitals and we are trying to repair them and make them work.



Repaired ventilator of hospitals

6. Developing and testing some other useful devices to fight with Coronavirus – There are some other useful medical devices that are being developed and tested at the innovation center in order to help minimize the outbreak of Coronavirus. Some of the concepts and ideas to develop the different things were given by people through email and some ideas were found from the Internet.

- a. Developing disinfection boxes using UVC (Ultra-violet C) light and Hydrogen Peroxide – Because of the acute shortage of N95 masks in the market we have developed UVC chambers to disinfect the used N95 masks for reuse. The system is being tested at Teaching Hospital in Kathmandu and at the laboratory of Microbiology Department of Tribhuvan University. Also we are developing another system for disinfection using Hydrogen Peroxide for the same purpose. The test results are good and we are preparing to build more UVC boxes to be distributed to the hospitals



Ultraviolet C Disinfectant Box

- b. Developing masks using HEPA filter and N99 filter as alternative masks – There is a huge shortage of N95 masks in the market. Alternative masks using the fabrics of HEPA filter and N99 filter have been made and are being tested at the laboratory of Tilganga Eye Hospital in Kathmandu. The test result looks good. It has been found that HEPA filters can filter the tiny particles as good as N95 masks and N99 filters do better than N95 Masks. We are trying to find the raw materials now in the market.



Masks made from HEPA Filter and N99 Filter

- c. Developing Emergency Ventilator – Based upon the design of EVent made by researchers at MIT and design given by engineers of TU Delft, Netherlands, we have also developed a prototype of emergency ventilator at the innovation center. The prototypes are under testing now. More emergency ventilators can be made if the situation worsen and if emergency ventilators are needed.



- d. Developing robots to deliver food – Because of demand from isolation centers at Corona hospitals, a simple but autonomous robot to deliver food and medicines has been developed and are being tested at the center. Those robots have been delivered to Nepal Army Hospital in Chauni, Kathmandu. More robots will be made soon because we have received requests from BPKIHS Hospital Dharan, Nepal Armed Police Hospital Balambu and Corona patient treatment centers.



Robot to deliver food and medicine at Corona treatment center

- e. Developing Infrared Thermo-gun – Because of the lack of thermo-gun to measure the temperature of patients, local governments requested for help to get thermo-guns. Therefore we are developing thermo-gun and testing them. Those thermo-guns can be produced if needed.
7. Partner Organizations – After National Innovation Center started the Corona virus mitigation campaign, America Nepal Medical Foundation came first to collaborate and work with us. After that several other organizations and individuals came forward to collaborate in the campaign. Here they are –
- America Nepal Medical Foundation, USA
 - Nepal Biomedical Association
 - Protech Nepal
 - Teaching Hospital, Kathmandu
 - Bir Hospital, Kathmandu
 - Nepal Army
 - Panchakanya Group
 - Kavach Garment
 - Raymonds Tailoring
 - Call A Tailoring
 - Kishor Rimal, Rabindra Maharjan, Radheshyam Malla, Dabbahadur Pun for providing vehicles for transporting materials and people.
 - There are around 22 researchers working at the innovation center for R&D and distribution.
8. Request for Collaboration and Support: More individuals and organizations are welcomed to collaborate for this corona campaign. You can contact Mahabir Pun, Chairman of National Innovation Center at mahabir@nicnepal.org or phone/WhatsApp/Viber at +9779841592361.

National Innovation Center is distributing all the things such as PPEs, Corona Booth, Aerosol Box and others free of cost to people. If you would like to donate for this cause and campaign, please have a look at the following options and choose one to donate.

- Rastriya Awiskar Kendra
Himalayan Bank Limited Thamel Branch
Account No. - 01906322060017

2. Global IME Bank
Rastriya Awiskar Kendra, Nayabaneshor Branch
Account No. - I101010000686.

3. eSewa in Nepal - <http://nicnepal.esewa.com.np/>

4. GoFundMe

- <https://www.gofundme.com/f/nic-hfn?member=1280834&fbclid=IwAR1LTrIFKQFd--jReKnPwEjshkN1k2D76CnvMcyboy3qGcB5DQ5fV3wukGk>

Thank you very much. I appreciate for your interest.



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