Covid-19 is driving a digital health care revolution

Former Democratic presidential hopeful Andrew Yang first cautioned that the world is now undergoing a Fourth Industrial Revolution, and everyone needs to be prepared for how the adoption of cyber-physical systems will significantly change the way people live and work.

This new world takes computerization a step further to include smart technology like artificial intelligence, facial ID recognition, 3D printing, genome editing and digital health-care sensors.

In parts of Africa and Asia with a prevalence of infectious diseases, poverty and rapid population growth, programs are in place to provide digital identification with vaccines and possible birth-control implants with a microchip.

Last September, the ID2020 Alliance that provides digital ID, in collaboration with the vaccine alliance Gavi and the government of Bangladesh, launched a new program combining biometrics and blockchain to provide digital ID with vaccines.

Both ID2020 and the Gavi Alliance are supported by Bill Gates through Microsoft and the Bill and Melinda Gates Foundation and the program leverages immunization as an opportunity to establish digital identity, which in this case would track who has received a vaccination.

According to an Pew Research analysis, Bangladesh would rank this year as the eighth-most populous country in the world, yet still suffers from widespread poverty.

Surveillance and tracking

The goal of this public-private partnership is to track undocumented individuals in less developed countries missing identification such as official birth registration or medical records, and thus may have lack access to health-care services and vaccines.

However, ID2020 is also active in more developed countries such as the US and has partnered with the City of Austin, Texas, to provide a blockchain-enabled digital ID platform for the homeless population, as well as to refugees receiving medical treatment.

Now with the sudden onset of the Covid-19 pandemic, this seems to have presented an opportunity to fast-track global health into a new era of digital care.

Already there have been discussions about issuing an "immunity passport" to allow individuals a "back to work" pass in order to leave quarantine and engage in commerce again, whether through antibody testing or vaccines.

With the increased use of contactless payment, Microsoft in March filed a patent (No 060606) for a cryptocurrency system linked to body activity data such as brainwaves and body heat, moving closer toward a cashless economy in light of the Covid-19 contagion.

The US Congress' recently proposed the TRACE Act (HR 6666) to trace and quarantine potential Covid-19-infected persons. It would be further augmented by blockchain-enabled digital ID linked to records of immunization and cryptocurrency system enabled by body activity.

As such, novel digital-health-care concepts being tested in developing countries in Asia and Africa are now flowing to industrialized countries because of the pandemic. However, most digital health solutions still flow from developed to developing countries, especially for family planning and sustainable population growth.

Sustainable population growth

Again funded by the Bill and Melinda Gates Foundation, another example of this human-machine interface in health care is a wireless birth-control microchip that can be activated by remote control, as part of the Foundation's goal to bring family-planning services and supplies to 120 million women around the world by 2020.

In 2014, Bill Gates tapped the Massachusetts-based MicroCHIPS – recently acquired by San Diego biopharma company Daré Bioscience – to develop an implantable birth-control microchip that emits hormones and can be turned on and off for family planning.

Implanted under the skin, the microchip stores a supply of the hormone levonorgestrel in reservoirs hermetically sealed with titanium and platinum. The seal is melted with an electrical current supplied by the internal battery, which releases 30 micrograms of the hormone per day. After the drug is released, the seal hardens in place again, and the chip is estimated to last up to 16 years.
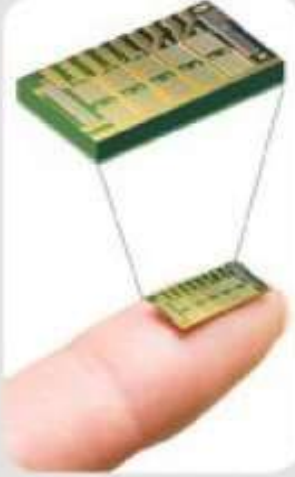MicroCHIPS still needs to file an application with the US Food and Drug Administration, and as with any chips and wireless devices, the technology will need to be heavily encrypted to prevent hackers from accessing the device.

Bill Gates' support for this technology can be traced back to his 2003 Public Broadcasting Service (PBS) interview with Bill Moyers, wherein he cited the Club of Rome's warnings on the limits of growth and depletion of the world's resources, which helped shape his concern over global challenges caused by unsustainable population growth, especially in impoverished countries.

Andrew Yang's warning that the 4h Industrial Revolution could replace workers with machines and also create a large unemployed population, provides an interesting juxtaposition between two views: Yang's view of technology as a cause of surplus labor and "overpopulation" in a scarce labor market, while Gates views technology not as a problem, but rather as the solution to help reduce population and surplus labor in global health and global markets.
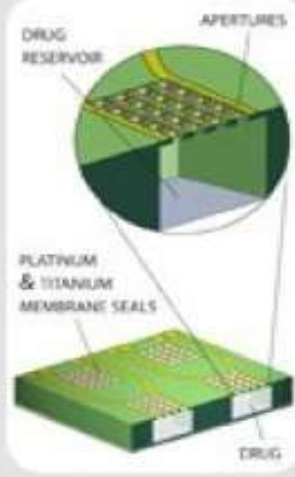
A diagram showing how the wireless implant works
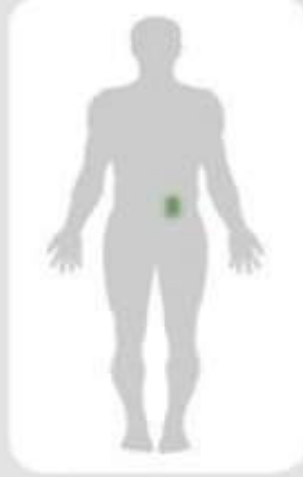
THE FIRST DRUG DELIVERY MICROCHIP

Microchip-based implant wirelessly programmed to release drugs inside the body.

1. RESERVOIRS ARE FILLED WITH DRUGS

APERTURES
DRUG RESERVOIR
PLATINUM & TITANIUM MEMBRANE SEALS
DRUG

Prior to implanting, drugs are stored in an array of sealed microreservoirs.

2. DEVICE IS IMPLANTED

Device with microchip is implanted under skin.

3. DEVICE IS ACTIVATED

WIRELESS SIGNAL
DRUG

When electrical current is applied, the membrane sealing the microreservoir melts...

4. DRUG IS RELEASED

DRUG

...releasing drug from the reservoir.

5. ONGOING DRUG ADMINISTRATION

EMPTY DRUG RESERVOIR

When drug reservoir is empty, the next dose can be delivered from another reservoir.

MicroCHIPS