

Grant challenge write-up –
Supercourse Newsletter
May 6, 2003

www.pitt.edu/~super1/
www.bibalex.org/SuperCourse/
www.bibalex.org/english/initiatives/SupercourseArchive.htm

Dear Friends:

Yesterday we came across a fascinating project called the “Grand Challenge” with is co sponsored by NIH and the Gates foundation.

The Bill & Melinda Gates Foundation is establishing the Grand Challenges in Global Health initiative—a major new effort and partnership with the National Institutes of Health (NIH) and the Foundation for the National Institutes of Health (FNIH). This initiative will identify critical scientific challenges in global health and increase research on diseases that cause millions of deaths in the developing world each year.

No money will be awarded, but if grand challenge is identified, then resources for funding of grants in this area will be provided. There will be 10-15 grand challenges of global health identified.

We thought that we would submit the concept of telepreventive medicine and the Supercourse for review as a grand challenge. It will be submitted by us, the Supercourse Team, which includes you!!

We would appreciate if you could review the material below and send comments to ronlaporte@aol.com. Thank you so much.

In a few days we will be sending to you the Golden Lecture.

Best Regards from:
Ron, Faina, Mita, Eugene, Bill Gates, Akira, Wendy, Soni, Abed, Julia, Tomoko, Beatriz, Tom, Deb

If you like to come off this list, please send a note to super2@pitt.edu

Grand Challenge:

Telepreventive Medicine

Prevention Knowledge on Demand, Any time, Any Place, Any One
By the Supercourse Family of 9250 Global Faculty

Abstract: There has been a 30 year increase in life expectancy since 1900 which represents the greatest rate of increased seen in history. It has been estimated that over 90% of the increase was due to prevention. Prevention represents shared information about avoiding disease. If we could harness prevention with the IT revolution, we would produce a global discipline of

telepreventive medicine. Prevention knowledge is the key to improved health. The global challenge will be 1) create a global health network bringing together all those engaged in prevention, 2) establishing an Internet backbone to the monitoring of disease as currently surveillance world wide is extremely incomplete, slow and inaccurate, 3) establishing a system of prevention information on demand, where bridges between existing community information exchange systems link to the Internet, and 4) creating an open source system to develop high quality scientific content about prevention that can be then used at the local level. This telepreventive medicine approach may be THE most important technology for the continuous improvement of health and thus must be top priority for the grand challenge of global health.

Overview: The Grand Challenge of Telepreventive Medicine

During the past millennium global life expectancy has risen from less than 25 years of age at 1000 AD, to 35 years of age in the middle ages, to 40 years of age in 1900. Over this period it took 1900 years to achieve a 15 year increase in life expectancy. Since 1900 life expectancy world wide increased to over 70 years, an increase of 30 years in but 100 years. A similar pattern occurred for developed and developing countries alike. As Wolfenson from the World Bank has said, life expectancy has risen more in the past 40 years, than it has in the past 4000. We are healthier now than we have ever been. Most certainly there are enormous health problems and disparities but world wide but the vast majority of the people are healthier than their grandparents. The reason is prevention. It has been estimated by the World Bank and others that 28 of the 30 year increase has due to prevention.

Information Sharing is the primary component of prevention. Knowledge about hygiene, nutrition, location of potable water, safe sex, containment of infections, smoking cessation, physical activity are all information sharing. If we could harness the information revolution for prevention, this could have a powerful effect on health. The Economist pointed out that if the automobile industry progressed as rapidly as Information Technology (IT), an automobile would travel at 150,000 km/hour, it would get 100,000 km/liter of gas, and cost \$5.00. A health grand challenge is how to marry prevention with the IT revolution.

Prevention is the exchange of information, the collection of data, surveillance, transmission of information and communication with people. Information is the infrastructure on which prevention is built, but it is a rickety, antiquated and expensive infrastructure. There needs to be a telepreventive medicine infrastructure, representing cheap, low bandwidth systems, reaching large numbers of people to prevent disease. As the Internet reaches <10% of the people world wide, this system needs to interface with existing information exchange systems such as village elders, postal systems, religion information systems and even grandmothers to make available prevention knowledge, anytime, any place and any where.
<http://bmj.com/cgi/content/full/323/7314/694/b>

The marriage of Prevention and IT are critical in this borderless world. AIDS, SARS, Acid Rain, population growth, global obesity, the decline of CHD, and global warming, are all part of international health and wellness. There is a critical need for a global network of prevention so that "mass customized" prevention will be available on demand.
<http://bmj.com/cgi/content/full/313/7069/1383/a>

The Grand Challenge of Telepreventive Medicine consists of 4 components:
1. Networking everyone in prevention world wide. As health is global, should an outbreak of West Nile Fever occur in NYC, input from Egypt would be most valuable. Similarly the rapid rise of Diabetes in the Ivory Coast could gain by the experiences of diabetes control in France. Monitoring the incidence of disease in Brazil may provide important insight into forthcoming disease in Argentina if the information could be shared. This is indeed feasible as we have already created a network on the Internet of 9750 faculty from 151 countries, 4000 of which are from developing countries.

2. Improving monitoring and forecasting of diseases: "The Answer my friend is blowin' in the wind" <http://www.pitt.edu/~rlaporte/ref4.html>

Honda sold 9.25 million motorcycles last year, and McDonalds now has sold 99 Billion hamburgers. Companies would go broke if they could not monitor global, regional and local product sales. The size of these companies pall in comparison to the 1,000 Trillion dollar health business, yet our systems of monitoring new cases of disease are almost non-existent. The US discovered a down turn of CHD 15 years after it occurred, and SARS illustrated how difficult it was to monitor a new disease. There is almost no monitoring of the incidence of non-communicable diseases. For infectious diseases the systems miss 10-90% of the cases. Without accurate monitoring of incidence we know little about our successes and failures for prevention, iatrogenic threats, and new threats. We argued that with that the networking of global scientists and statistical technology such as capture-recapture could establish a Tele-surveillance system for all diseases. An ideal model is the weather bureau. Why cannot we discuss about the today's health in eastern Russia, and then drill down to Moscow, and to your neighborhood? It is indeed feasible with weather, and it should also be with health. Specific challenges would be the establishment of the technical and statistical tools at the local level to assure accuracy in "counting" diseases to feed nationally and globally.

3. Prevention Information on Demand: Any Time, Any Place, Any Body
There is an enormous amount of information on the Web and elsewhere about prevention. Little of this information trickles down to the people who need most. We need to establish systems as above where a large amount of global surveillance data are collected, and analyzed by "high end" systems through Internet2. These systems communicate however with only 1000s of people, we need to reach billions for prevention. There needs to be Prevention systems that bridge the bandwidth spectrum. At the lowest end of bandwidth are neighbors talking with neighbors, verbal autopsies, this information needs to be fed up the chain of bandwidth to Supercomputers for analysis and forecasting, and rapidly sent back for community and person decision making about health. Many people have talked about connecting everyone in the last mile. The reality is that this is that it is unlikely to ever occur, as less than 10% of the people are connected, in the year 2020, this may rise to 12%. Instead of trying to connect everyone, there needs to be technology to interface the Internet with existing channels of information sharing, this includes information sharing in the community by elders, through religion with clerics, priests and rabbis, local governments and schools as well as families. There needs to be the technology to "Mass Customize" the prevention messages so that different communities of users can easily make the knowledge "actionable". The conduit to do this is the local public health official who is in the global network, thus pushing the information through this conduit. The scientific and technological challenge is how to create the local interfaces and mass customization of the prevention message.

4. Content: We need good scientific content to push through a Global Health Network. We have taken one approach, that of the Supercourse (www.pitt.edu/~super1) This is an open source system of PowerPoint lectures on demand. It has been constructed by 9450 faculty from 151 countries and currently has 1300 lectures. We are reaching across the digital divide with 39 mirrored servers (e.g. in Mongolia, the Sudan and Malaysia), we distributed 10,000 CDs which are then re-copied, and are building Prevention PowerPoint comic books for global distribution. Systems like this of global sharing of content are feasible. We have a Muslim network (300 members), a Former Soviet Union network (300 people), and Pakistani network (510 scientists)

Impact: Much of the mission presented concerning the Grand Challenges talked about Malaria, Aids and TB. Clearly these are major scourges with Malaria and Aids killing 2-3 million each and TB one million. If we could eliminate all 3, this would eliminate about 10% of the deaths in the world each year, a remarkable total.

However, the effect of improving prevention knowledge may be far greater, and much less costly. "The most urgent task before us is to get medical and health knowledge to those most in need of that knowledge. Of the approximately 50 million people who were dying each year in the late 1980's, fully two thirds could have been saved through application of that knowledge." Grant J. Med Educ 994;28(suppl 1):11

