The Brain-to-Society Roadmap

To Ensure Sustainable Healthy Eating

WORKSHOP REPORT | September 29-30, 2010 | Montreal, Quebec

Open Collaboration for a Science of the *Hows* to Lead, Manage, and Govern Complexity for a 21st Century Aligned with the Limits and Power of Human Biology

McGill

World Platform
for Health and Economic Convergence

Purpose of this Document

This document is intended as a record of the discussions that took place during the Second International Roadmap Development Workshop, hosted by the McGill World Platform for Health and Economic Convergence (MWP) in Montreal, Canada on September 29 and 30, 2010. This event will be used by the Public Health Agency of Canada and the MWP to develop the Brain-to-Society Roadmap, a three-year capacity-building research program. The BtS Roadmap will scale up our ability to address some of the most complex problems facing the world today, problems which have emerged from a misalignment between local, national, and global markets, economies and societies. The BtS Roadmap will first focus on healthy eating.

The BtS Roadmap is led by the McGill World Platform for Health and Economic Convergence, a unique initiative anchored in McGill University's Desautels Faculty of Management and Faculty of Medicine.

About the Workshop

This workshop was organized by the MWP as the second in a series of international roadmap development workshops that will identify and develop the projects and subprojects of the BtS Roadmap, a three-year research agenda.

Approximately 100 participants, from various organizations and disciplines, attended the workshop. The list of participants is set out in Appendix A and the agenda appears in Appendix B.

TRANSFORMATION collaborative collaborative TRANSFORMATION

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EXECUTIVE SUMMARY

This report presents the discussions and outcomes of the Second International Roadmap Development Workshop, hosted by the McGill World Platform for Health and Economic Convergence in Montreal, Canada on September 29 and 30, 2010. A group of 100 experts considered how they could work together to tackle complex issues at the interface of health and economics. Participants hailed from leading health, social, business and economic organizations from all levels of society, that are pioneering the recent advances in genetics, neuroscience and computational systems sciences. Appendices A and B present respectively the list of participants and the workshop agenda.

The workshop's objective was to begin sketching out the portfolio of projects underpining the Brain-to-Society Roadmap research agenda. The BtS Roadmap is to act as a catalyst for the implementation of healthy living solutions in the areas of obesity and chronic disease; maternal and child health and nutrition; food and nutrition security; and agriculture, health and the environment.

The first day began with a series of presentations, panels, and plenary discussions in which world experts in science, complex collaboration and innovation provided insights to help conceive the BtS Roadmap and scale up what it could achieve. On the second day, seven parallel working groups engaged in meaningful discussions to identify the intended outcomes of various focused research topics and to explore opportunities for innovation and collaboration in the development and implementation of the three-year BtS Roadmap. This event, along with subsequent deliberations and analyses have allowed for the preliminary outline of a portfolio of projects, currently the foundation of the BtS Roadmap. They are further described in *The Brain-to-Society Roadmap for Health, Well-Being and Sustainable Prosperity*.

The two-day workshop was concluded by a closing dinner featuring a keynote address by the Nobel Peace Prize recipient Dr. Muhammad Yunus and a roundtable discussion on the theme "Can a Social Wall Street Become a Reality? Weaving Nature and Nurture into Finance to Address Health and Economic Challenges of the Poor."

> "The current financial crisis makes it very clear that the system that we have isn't really working, and this is the right time for us to undo things and build them in a new way".
>
> - MUHAMMAD YUNUS

BACKGROUND

The McGill World Platform for Health and Economic Convergence

Building upon the assets of one of Canada's premiere research academic institutions, the McGill World Platform for Health and Economic Convergence (MWP) is a unique initiative led by McGill University's Desautels Faculty of Management and Faculty of Medicine. The MWP was created in the context where the traditional divides between market, economy and society have created conditions that present tremendous challenges to human health and well-being. The MWP is rooted in the conviction that by joining and harnessing the power of the best minds and leading organizations in health, social, business and economic domains with that of the most recent developments in genetics, neuroscience and computational systems sciences, these divides can be bridged, and complex issues at the interface of health and economics, tackled. The MWP's mission is to foster developments in science, policy, innovation, and education to mainstream health into the management and economic decisions that impact health and healthcare, and conversely, to weave management and economic considerations into public health and health care systems design and delivery. The MWP carries out cutting-edge trans-disciplinary research and innovative knowledge-to-action programs and activities to achieve complex collaboration and innovation, encompassing business, social and institutional innovation, open innovation, social change and collective action, policy convergence, as well as trans-disciplinary and distributed education and research. The MWP is meant to be a source of cutting-edge knowledge on issues at the interface of human biology, health, business and economics.

The MWP's mandate includes the intention to develop and apply the methods and skills needed to lead, manage and govern complexity in addressing the world's most complex challenges. In multiple engagements with stakeholders and partner organizations over the last several months, it is evident that any approach to resolving these problems must be based on multi-sector collaboration.

The Brain-to-Society Roadmap

The Brain-to-Society Roadmap is designed to fill a gap in traditional research activities that sought to address complex issues through a single perspective. It takes a transdisciplinary, multi-sectoral and multi-level approach to the study of lifestyle choices that impact health and healthcare, with an initial focus on healthy eating. The BtS Roadmap program is unique in that it examines individual choice as a joint outcome of gene, brain and society. In this field, biology influences individual choice and behavior, and is in constant interaction with the environment. Both biology and environment are seen as being part of the same complex system in need of alignment. The research agenda is supported by provincial, national and international health, social science and humanities funding agencies.

SETTING THE CONTEXT

Complex Health Challenges

In coming years, major advances in national and global health outcomes will critically depend on our ability to better align the determinants of health with the economic, social, ecological, and governance domains. This will allows us to produce modern environmental conditions that biology can better handle. The major diseases of the developed world – ranging from obesity and chronic diseases to mental health – have resulted from the misalignment between a brain that evolved in dramatically different conditions and the environmental conditions that emerged in the aggregate from the everyday and strategic decisions made by in local, national and global communities, organizations and systems. A different but equally critical misalignment between human biology and environment is at the root of our inability to eradicate hunger and nutritional deficiency, even though there is sufficient food being produced around the world.

With regards to diet-related health outcomes, individuals as well as communities, organizations and systems interacting in contemporary societies to drive food supply and demand, have complex motives and operate on multiple scales to generate both productive and innovative as well as destructive and perverse outcomes for society as a whole, as well as for themselves and their respective sectors. This applies in particular to industries whose offering shapes the energy balance of the diet, whether we focus on agriculture and food, television and media, computer and other technologies, car and other transportation means, etc. Centers of decision that are formally independent of each other become, in fact, part of the same system. Together, this produces deeply "nested challenges" in aligning modern society with the power and limits of human biology, where health, economic performance and other local, national or global outcomes cannot be targeted and monitored independently of each others.

These nested challenges have thus far not been addressed successfully because of the clear boundaries set by the two-pronged institutional diagnoss underlying modern society since the onset of the industrial revolution. This framework is anchored, on one hand, in market mechanisms aligning industry supply with consumer demand and, on the other hand, in social and political governance for market regulation and non-market domains, such as health and human development, funded by taxes and other public or philanthropic sources. It is assumed that what business does best is doing business and, therefore, health and other social parameters should remain peripheral to the strategic agenda. As good members of the society, corporations are expected to pay taxes and to comply with regulations when these are deemed necessary to solve or prevent "market failures".

> As health impact grows and healthcare costs rise dramatically worldwide, they threaten societal and economic sustainability of individuals, organizations and nations.

Complex nested health challenges such as obesity and chronic diseases differ from other health problems, where precise "market failures" can be easily singled out as causal agents, as is the case of food safety or cigarette smoking, for instance. In these latter cases, precise and strict regulations can be developed and reinforced to eradicate such toxic agents. The policy battle over obesity and chronic diseases is shaping up to resemble the policy battle over cigarette smoking of the 1990s, and it bears pointing out that a key element in that battle was the scientific evidence that nicotine was addictive, a process not unlike the wired-in impulsive response to food and food cues in the environment. Governments are already using some of the policies that were used to combat smoking: taxation, prohibition, and health warnings.

At the same time, food is not a toxic substance to eradicate because of the potential negative long-term impact of its excessive consumption. It is the fuel that our species have learned to rely on for survival that soon became too easily

accessible as agricultural and industrial development arose. Food is also a hedonic and symbolic object imbued with one's personal, social and cultural identity. Health and other motives underlying food choice are intrinsic components of the value we attach to food and they could be carefully nurtured by family, community, media and other cultural leaders. They can also be sustainably capitalized upon by business in an economically sustainable manner, in the development of a less caloric, but equally pleasurable and profitable, food supply. There is therefore a need for community market transformation around the world, be it to restore caloric balance in modern industrialized societies such as Canada, USA or the EU, by the adoption of policy and broad governmental action plans, or to prevent the rise of obesity and chronic disease in emerging economies and middle income countries such as India and China.

In fact, bottom up changes are happening. Local communities and civil societies around the world are more aware than ever of their capacity and their limit in shaping such complex dynamics, impacting the behavior of individuals and families. Similarly, entrepreneurs and business executives in national and transnational corporations realize that developing products, services and programs that are health-promoting and sustainable is not simply a matter of corporate social responsibility but can also be a key driver of transformation, innovation and long-term strategic achievement.

There is a need to create and scale up sectoral and cross-sectoral policy approaches to diet-related health challenges in order to link appropriate and sufficient investment and incentives with transformation in communities, businesses, media, and markets – whether commodity, consumption or finance – to foster complex multi-level and cross-sectoral collaboration and innovation to change and sustain individual and family choice in a health-promoting direction. To this end, current surveillance and management information guiding public health and health care policy and practice must articulate common mindset, metrics, methods and models with the social and economic processes and outcomes that contribute to the modern environment.

The Brain-to-Society Roadmap – a worldwide open collaboration effort –aims at articulating a new science of the *hows* to lead, manage, and govern complexity in a 21st century aligned with the limits and power of human biology.

THE BRAIN-TO-SOCIETY ROADMAP

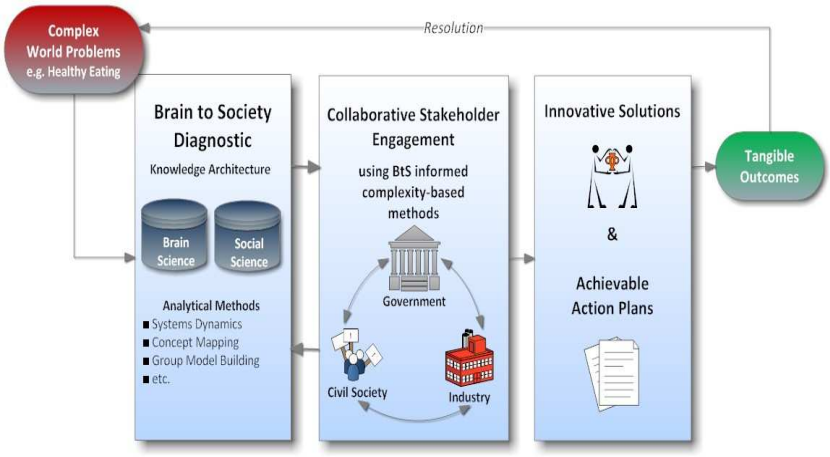
Overview of the Project

The complex health challenges and opportunities set the foundations for the Healthy Eating component of the Brain-to-Society Roadmap – an open research and collaboration initiative led by the McGill World Platform for Health and Economic Convergence. The BtS Roadmap aims at articulating a new science of the *hows* to feed and be fed by complex collaboration and innovation across disciplines, sectors, and jurisdictions for scaling up our ability to address issues that lie at the interfaces of biology and modern society – taking healthy eating as the first domain of application. To do so, the BtS Roadmap capitalizes on cutting-edge methods, metrics and models from genetic, neuroscience and computational systems science, combined with those of health, behavioral, social, agricultural, business and economic disciplines. The MWP initiated this ambitious project by partnering with several academic institutions worldwide and now invites a wide range of partners from academia, the private sector, civil society, and government in relevant domains of activity to join in developing a three-year roadmap to build capacity in science and policy through corporate, social and institutional complex collaboration and innovation.

The BtS Roadmap builds upon the groundbreaking accomplishments of the Human Genome Sequencing Project and of the diagnostic approach to research and action in environment science pioneered by 2009 Nobel Laureate of Economics, Elinor Ostrom. A series of projects will first look at the individual to examine the degree to which individual differences in genetics, neuro-cognition, and socio-environmental exposures modulate behavior, body weight, and nutritional risk over time. A second series of projects will examine how exposure conditions emerge from the single and combined impact of policy, investment, business and social innovation made by different stakeholders. In a scientifically rigorous and action-oriented manner, partners in the BtS Roadmap will build capacity for a complementary set of research, complex collaboration and innovation protocols. These will include the creation of an integrative knowledge platform to facilitate the comprehensive and timely accumulation of comparable multi-level, cross-sectoral and cross-sector metrics, methods and models.

The BtS Roadmap: The Healthy Eating Component

A holistic view of the Brain-to-Society Roadmap is represented in the diagram below.



Holistic View of the Brain-to-Society Diagnostic Project

The Project Intends to Deliver Unique Value in Three Areas:

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1. Integrate Multi-Disciplinary Research into a Diagnostic Suite of projects capable of rendering insightful system models that, together, empowers change at multiple levels:

BTS CAN EMPOWER GOVERNMENTS to change by:

- Being a catalyst for the political will necessary for change;
- Creating evidence that will enable effective policies; and
- Informing government investment into innovative solutions.

BTS CAN EMPOWER INDUSTRY to change by:

- Transcending the current barriers to industry involvement;
- Accelerating the design of innovative solutions.

BTS CAN EMPOWER CIVIL SOCIETY to change by:

- Leveraging the role of critical stakeholders for knowledge translation and the move to action.

2. Convene Multi-Sector Stakeholders Using Advanced Methods of Collaboration and Innovation to achieve the buy-in, commitment and clarity necessary to deliver on the outcomes that will resolve the problems being addressed.

3. Create the Knowledge and the Relationships Necessary to Harness the Power of Government and Business to implement innovation for promoting healthy eating in all its facets:

- Childhood and adult obesity prevention
- Food and nutrition security
- Chronic disease prevention
- Maternal and child nutrition
- Food safety at the interface of agriculture, health, and environment

Outcomes of the First International Roadmap Development Workshop

The First International Roadmap Development workshop was held in Toronto on June 15 and 16, 2010. It gathered disciplinary specialists from several domains relevant to healthy eating: data providers and experts, neuroscientists and systems scientists, key policy- and decision-makers, and business and community leaders, to set the preliminary foundations of the BtS Roadmap. The workshop, which focused on obesity and chronic disease prevention, contributed to identifying knowledge gaps and research needs; sought consensus on the priority issues, themes and objectives of the Roadmap; explored mechanisms and recommendations for moving the Roadmap forward; and identified the key elements of a research program which considered a multi-partner approach to achieving common objectives.

The following **FOUR PRIORITIES** were identified as those that would have the highest impact and that were most urgently needed.

Engage Industry
in understanding the benefits of nutritional leadership and how it can be a win-win business model for industry and society
(i.e., profitable food that is healthy)

Create a Shared Knowledge Bank
to better inform policy decisions

Develop Models
to better understand the determinants of healthy eating and to better leverage them to address obesity

Encourage Government
to take a leadership role in setting plans and goals, and to leverage them in addressing obesity

WORKSHOP OBJECTIVES

The Second International Roadmap Development Workshop

The Second International Roadmap Development workshop expanded the scope to all facets of healthy eating and continued building on the collective experiences of systems modeling; business case development; chronic diseases and obesity; agriculture; food and nutrition security; maternal and child health; and the environment, in order to:

- **Identify key knowledge gaps** for scaling up and sustaining changes on the ground for healthy eating.
- **Seek consensus on the objectives** for and clarify the intended outcomes of the Brain-to-Society Roadmap.
- **Explore mechanisms and opportunities** for moving the Brain-to-Society Roadmap forward.
- **Develop projects for complex collaboration and innovation** in science, policy and action to advance the Brain-to-Society Roadmap.

EXPERT VIEWS

DAY 1 of the workshop | September 29, 2010

The first day of the workshop was comprised of keynote presentations by experts in science, complex collaboration and innovation in various domains. These were followed by a panel and general discussions where participants explored how to scale up what the BtS Roadmap could achieve. Participants provided insights from their respective approaches to obesity and healthy eating research and provided an overview of the state of research on the subject matter. Key messages from each presentation are described below.

Opening Remarks

Laurette DUBE, McGill World Platform for Health and Economic Convergence

THE NEED FOR CROSS-SECTORAL POLICY APPROACHES TO DIET-RELATED HEALTH CHALLENGES

Laurette Dube, the Founding Chair and Scientific Director of the McGill World Platform, welcomed participants to the Second International Roadmap Development workshop and provided some background on the three-year program for further the development of healthy eating component of the Brain-to-Society Roadmap. Dr. Dube pointed out that we would need to, in a much more nested manner, merge science, policy and action across a number of disciplines in order to facilitate the necessary action whether for the governmental policy, community information or business innovation. With that in mind, Dr. Dube emphasized that the BtS Roadmap brought together the collaborators from around the world in science, policy, action and education to work together in building capacity that would not emerge otherwise.

Dr. Dube further gave an overview of the workshop's goals identifying forward-looking objectives of the BtS Roadmap and how various components of the brain and society influence the decisions individuals take on healthy eating.

In closing, Dr. Dube acknowledged the wealth of capacity and expertise of the workshop participants pointing out that developing projects for complex collaboration and innovation would help define what can be done to leverage future endeavors and that she was looking forward to hearing the outcomes of the discussions.

Opening Keynote Address

Didier SORNETTE, ETH Zurich

HEALTHY FINANCE AND HEALTHY LIVING: CHALLENGES AND SOLUTIONS

To set the stage for the workshop, Didier Sornette drew parallels between finance and healthy eating and their fundamental conflict of interests and mis-incentives. There is the recognition that there has been an immense progress in innovation in both systems where financial development fostered the use of economic development, welfare, education and innovations in the food and healthcare system fostered the longevity increase. However, there are problems (outlined below):

- **Financial System**: the root cause of the crisis is our illusion on financial solution to growth (high returns, above GDP growth).
- **Food and Healthcare**: the root cause of the coming healthcare crisis is our illusion in technical/medical solutions and the misaligned incentives of the industry, which has a vested interest in “keeping us marginally ill”.

In the presence of competition and regulations in complex and uncertain environments, optimizing agents will almost always find the optimal on the (fuzzy) boundaries... leading progressively to excesses, such as creative accounting, moral hazard, conflict of interests, and so on. Is there a possible solution for financial health? Is there evidence that the new financial innovations and a much expanded bank system have brought any real gain for innovations, economic development, and employment? Is there a possible solution for healthy lives? Dr. Sornette pointed out two solutions:

1. Why Consumers -- Not Companies -- Should Make Health Care Decisions Mike McCallister, president and CEO of Humana, is precise when he chooses his words to describe the U.S. health care industry. "We don't actually have a health care system. We have a lot of different systems that are glued together," he told an audience at the recent 2009 Wharton Health Care Business Conference. And because of that, he noted, "the incentives are wrong for virtually everyone, including providers, payers and patients."
2. One Way to Lower Health Costs: Pay People to Be Healthy When employers want their employees to live healthier lifestyles -- to lose weight, stop smoking and exercise regularly -- nothing works like cash, according to research led by Wharton faculty. While some may wince at the notion of paying people to do the right thing, the research found that the incentives cost less than the diseases they prevent.

Promoting sustainable behavior by means of “social capital”: Field studies and lab experiments in close combination with complex system theory (ABM) can considerably contribute to improve the understanding of cooperation in order to promote and spread a sustainable behavior. Examples include: Microfinance (Yunus): losses and defaults of micro credits are almost negligible. The implementation of joint liabilities, social collateral and peer pressure mechanisms ensures a sustainable, effective and efficient way for self-help without spending money. In sum, solutions are the mixture of “old” forgotten recipes + social capital and innovation (through the bottom-up approach).

SESSION 1

Key Knowledge Gaps for Scaling Up and Sustaining Changes on the Ground for Healthy Eating

THE PREVENTION OF OBESITY AND CHRONIC DISEASES

Conceptual Model for Healthy Eating Habits and Physically Active Lifestyles

Eric MYLES, Québec En Forme

Mr Myles presented the strategy, funded by Québec En Forme, to fight obesity and promote active living. This joint strategy for the promotion, mobilization, partnership and development was put together by government and the Lucie and André Chagnon Foundation. The strategy also partnered with:

- Health Ministry
- Education, Leisure and Sport Ministry
- Agriculture, Fisheries and Food Ministry
- Family and Seniors Ministry
- Municipal Affairs and Regions Ministry
- Work and Social Solidarity Ministry
- Transportation Ministry
- Youth Secretariat
- Consumer Protection Office
- Public Health Institute

Governance of the Foundation

- To work together with public powers, civil society, local communities and companies
- Increases interventions, more freedom of actions and more responsibilities for the private sector
- Intersectoral action and coordination unite a community of interest
- Connection is a cohesion and coherence factor in an organization

The strategy works vertically as well as horizontally (local, regional, national) and includes both micro- (i.e. living environment) and macro- (physical, economic, political, socio-cultural, youth) environments (bottom-up approach). The strategy is more of a societal plan than a series of projects; it promotes innovation and positions itself at every level of the society encompassing public policy factors.

Obesity: What Do We Know, What Should We Do, and How Should We Do It?

Harry RUTTER, National Obesity Observatory/University of Oxford

The challenges we have and those that lay ahead in terms of tackling obesity and ways in which we may want to work together. There is likely to be a difference in obesity prevalence between measured and self-reported data. There is an extraordinary profusion of marketing approaches in the food industry, across the huge variety of brands for consumers to choose from, and at the same time we are seeing new markets emerge.

In terms of conceptualizing the challenges we look at, there is a need to act on many fronts at the same time. This is at the heart of an effective systems approach on working on the problem. It is helpful to consider the range of different scales of actions: start with the macro level, zoom down to micro level, then and then go back out again to see the big picture. If we only focus on individual aspects, we will fail to solve the problem - we need to consider the societal aspects too. It is also important not to be beguiled by the things we can easily see and know; look away from the obvious and into the gaps in our knowledge.

The National Obesity Observatory translates raw data and evidence on obesity in meaningful messages for policy makers and practitioners: putting usable information into the hands of people who have to act provides a vital tool.

FOOD CHAIN SUSTAINABILITY:

The Role of the Agriculture, Food and Health Systems in Addressing Healthy Eating in All its Dimensions of Food Insecurity, the Growing Burden of Over- and Under- Nutrition and Food Safety

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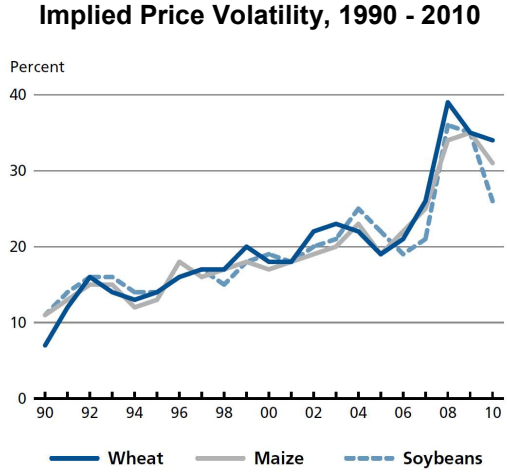
Policy Support for Agriculture and Nutrition and Health: Great idea, but….how exactly?

Patrick WEBB, Tufts University



The issues we are dealing with are extremely complex, and it is not always necessary to over-simplify. We need to understand what the appropriate tools to measure the complexity are, and that the solutions to deal with that complexity are not always going to be simple.

Implications for policy-making: the issue we should be focusing on here is not the food crisis, but rather of the food price crisis. Policy choices as well as the reactions to what is perceived as a problem matters a great deal (fears about the stocks, or falling output in terms of food production). As a matter of fact, the world has never seen so much food production as it is seeing it now, and yet, we are seeing the increased volatility around the price of that food (see graph) which is most problematic for the developing countries' consumers who are facing lots of budgetary constrains in food prices leaping and small farmer producers as well as for the policy-makers themselves. Hence, the issue is: how are the governments respond to these facts and to the perceptions of these facts?

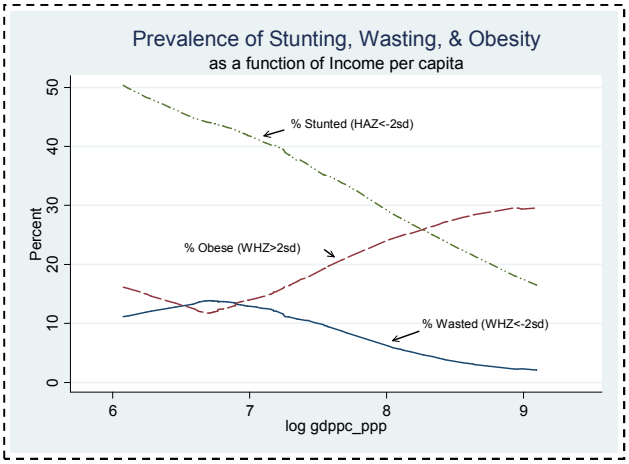
"No impending food crisis," says FAO
By Catherine Hornby
ROME | Fri Sep 24, 2010

Crop failures and speculation – not market fundamentals – were the main causes of recent price volatility in grain markets and there is no sign of an impending food crisis.

According to Dr Webb, one solution is to grow more food, but it is not the only solution. Investing in agriculture has been an engine of economic growth. In 2009, Timmer and Akkus noted: "no country has been able to sustain a rapid transition out of poverty without raising productivity in its agricultural sector." However, as transformation precedes economically, the role of agriculture declines. Further, Dr. Webb pointed out that the sustained economic transformation has involved:

1. Falling share of agriculture in economic output and employment
2. Population shift (rural to urban)
3. Rising economic activity in industry and services

In developing countries we find a reduction of stunting and malnutrition as a result of agricultureal policies. Simultaneously, however, there is a rise in rural and urban obesity (especially child obesity), as can be seen in the chart below. Of course, over time, obesity leads to chronic disease. Clearly, there is no single policy response could be a solution to this kind of complexity.



Dr. Webb concluded that health outcomes could not be understood outside of complex interactions with food systems, nutrition, agriculture and even trade, market and environmental systems. All systems appear increasingly volatile, with dangers of abrupt systems failures appearing to rise. More specificity is needed in the debate on policy support for each sector (all agriculture is not alike, etc.) The fact that rural (not just urban) obesity and diabetes are growing, is this support for wrong kind of agriculture? Or wrong kind of support for agriculture?

Food Chain Sustainability: The challenge of coordinated global development and the opportunity to leap-frog

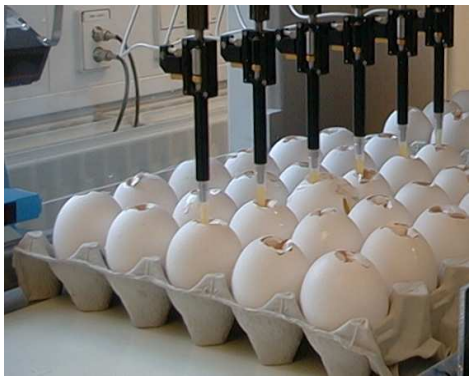
Jørgen SCHLUNDT, National Food Institute, Danish Technical University

There is a huge burden of disease caused by food globally, both from compromised safety and from poor nutritional choices. While safety has a long tradition for international standards, nutrition is often treated differently. In the food safety area there had been some attempt in trying to continuously improve the situation in terms of diminishing the level of food-borne disease. Hence, the principle of continuous improvement should work for safety and nutrition. We may wish to take some examples from safety side and extrapolate these to all food-related areas.

When looking at the increased globalization of food trade, there are International food (safety) standards (CODEX), those established by the FAO/WHO Codex Alimentarius Commission. Dr. Schlundt suggested the following points for continuous Improvement:

- Evaluate disease metrics and attribute to food
- Use new genetic fingerprinting to diagnose/link cases

- Define interventions, monitor effect, share experience
- Set targets – expecting continuous improvement
- Involve Industry – should have common goals?



Further, Dr. Schlundt highlighted the industry viewpoint stating that advances in public health and technology coupled with consumer expectations are changing the food world. The food industry and all parts of the food supply chain must step up and address issues proactively and accountability must be driven by corporate leadership. There is a need for a global food standards system that cuts across supply-chains is on the horizon. Experience from food (safety) standard setting should be expanded to food security and nutrition.

Dr Schlundt has pointed out that consumers were more and more sensitive about the quality and safety of food and health products. They ask for transparency and they need to know where the products they buy are coming from. Furthermore, customers and consumers care for sustainability: socially, ethically and environmentally.

When thinking of health implications (i.e. lowering the disease burden through international trade agreements), the scientific and regulatory support for facts-based management with appropriate inclusion of stakeholders is the most efficient way forward in our efforts to lower the disease burden related to food. The introduction of a risk-based framework will enable developing countries to learn from mistakes (and successes) elsewhere. These countries have the potential to "leap forward" into preventative systems focusing on risks. The existence of a rules based trading system in the food area will support such developments in developing countries.

Many food contamination events have international implications, as do new food product developments. Policies for food contamination prevention as well as good nutritional behavior should be developed through science-based management and communication. Capacity to estimate risk and benefit related to food needs to be built in all countries, based on the development of global tools and standardized methodology.

Dr. Schlundt noted that lowering the global disease burden related to food (risk and benefit) was possible through **international standards based on health considerations**. Improving economic development is possible through international trade of **better and safer food**. And the help to developing countries should not be given in a way costing lives in importing countries (lowering standards), but in a way that improves food **quality and safety both in exporting and importing country** (technical assistance as per SPS).

> "WE NEED an accepted international framework within which we can assess risk and benefit and share experience"
>
> - Jørgen SCHLUNDT

During the plenary discussions, participants agreed that a better linkage of agriculture to the rest of the sectors was needed and that the discussion should be taking place in a holistic way instead of focusing on single issues. It also requires not only discussions across sectors, but also a clear vision of what is it we are as a society trying to achieve. Currently, there are a number of examples from developing countries (Nepal, Haiti, Kenya) that move away from segmented policies (e.g. agriculture plan, health strategy, etc.) towards making attempts of having single national food/nutrition and sometimes health strategies.

SESSION 2

The BtS Roadmap –A Science of the *Hows* to Scale Up Changes on the Ground

THE BTS DIAGNOSTIC – SOCIETAL:

Bridging Metrics for Better Health and Economic Outcomes

Keynote Address

Timothy DOLSON, The Nielsen Company

In Search of Common Metrics, Methods and Models

Mr. Dolson spoke of the Nielsen's interest in what influences the product purchases. Nielsen tracks sales and retail product information across the world and reports what people are buying in over 80 countries. Nielsen Strategic Planner provides a comprehensive view across geographies and across categories to understand key product characteristic trends in sales over time. Nielsen's ScanTrack Store Level Databases reports sales information by individual store for a specific retailer-defined geography. Information includes category, brand, subtotal and UPC views with weekly data availability across volumetric, price and sales rate facts. To understand at a more granular level why people are buying products, Nielsen utilize Homescan, a Nielsen consumer panel of 250,000 households in 27 countries that scan all bar-coded consumer package goods purchases, as well as non-bar-coded perishable products. TV measurement that provides information on to what people are exposed in terms of advertising on TV as well as how the advertisers and manufactures are influencing people into buying the products that they are selling. Mr Dolson noted that this was useful information to drive policy or to send messages.

Data Complexity

William ROSS, Health Canada

Dr. Ross highlighted the issues when one was looking into these integrative problems from the point of data complexity: He noted that data was not itself informative; it encompassed data models, analytical models, variability and uncertainty factors. Modern problems are increasingly integrated and less distinct which produced a lot of complexity in data structures, analyses and interpretation (i.e. increased reliance on complex models; models are sometimes adequate but never true; old computational models are no longer inadequate).

Dr. Ross pointed out to the example of reduction of sodium in the food supply. This is a more integrated problem because no single dataset will do, hence, there is a need to pull few sets together (i.e. requires broad collaboration). Further, it has implications for heath and commerce as we are looking at modifying the food supply (i.e. economic, entrepreneurial, public health issues), which means the integration of different problems (complexity in problem definition, data structure, models and interpretation). Finally, the totality of data is limited because of the broad based models (natural and social sciences). Canada's Sodium Reduction Strategy is a good example of statistical modelling of scenarios.

Systems approach to data structures and analysis

- Information Technology
  - Enabler for:
    - analytical capacity
    - Data / information sharing
    - Accessibility
    - Communication
  - Adds complexity, and program risk
- Social Structure of data
  - Enabler for:
    - Comprehension, and knowledge
    - Problem resolution
    - Creativity
  - Adds complexity and program risk
    - Privacy, security, proprietary data, regulatory restrictions

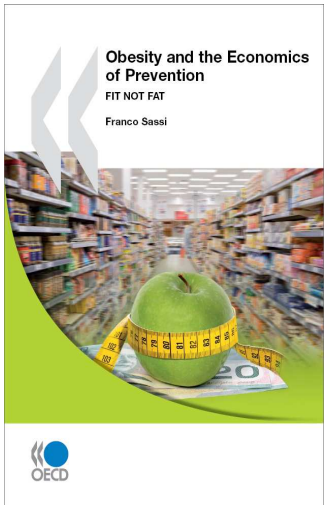
Modelling Lifestyles, Health and Prevention

Michele CECCHINI, OECD

Dr Cecchini spoke of the growing problem of obesity and its causes. The Organization for Economic Co-operation and Development (OECD) projects the further obesity to increase in the next 10-15 years. OECD fosters partnerships through modelling, and Dr. Cecchini highlighted the OECD's vision for health modelling as the following:

- Linking health to the labour market and the wider economy
- Modelling social influence on health
- Modelling health system components
- Optimizing use of input data

The OECD modeled a number of different interventions in the areas if health education and health promotion (e.g. mass media campaigns, school-based and worksite interventions), regulation and fiscal measures (e.g. government regulation or industry self-regulation of food advertising to children), and primary care-based interventions (e.g. physician counseling of individuals at risk). Dr Cecchini further presented results of this modeling for the OECD countries. The result of a single intervention alone is not as effective; OECD tried to assess the multiple intervention strategy, i.e. combining interventions to tackle different causes of a disease and at the same time different target groups; such intervention showed good results in terms of cost-effectiveness ratio and health outcomes.



Dr. Cecchini concluded with policy implications noting that prevention was an efficient way to improve population health; comprehensive prevention strategies provided best result; the most cost-effective interventions were outside the health care sector, but primary care interventions had largest impact; and a multi-stakeholder approach was required.

In Search of Common Metrics, Methods and Models: CARTaGENE

Philip AWADALLA, Université de Montréal

Professor Awadalla introduced the CARTaGENE project, a bio bank project based in Quebec with 20,000 participants who were recruited in the province. It is an infrastructure for science, is open to scientific community at large (locally and internationally) which includes questionnaires that evaluate the risk factors such an environmental exposure for chronic diseases. The project included the following components: (1) Recruitment within four Metropolitan areas covering 2/3 of the Quebec population, namely Montreal, Quebec, Sherbrooke, Chicoutimi (population strata defined by age, sex and Forward Sortation Area; probability proportional to size (PPS) to define quotas for each strata; and participants were randomly selected from FIPA files); (2) Enrolment (Sampling; Invitation; Consents; Follow-up); (3) Scheduling; (4) Assessment (Consent signature; Baseline interview; Physical test; Sample collection); (5) Biobanks (DNA extraction; Long-term storage); (6) Laboratories; (7) Study centre (Data warehouse; Quality control analysis; Keys management; Research projects; Etc.).

Questionnaires are self-administered which includes demographic factors (e.g. the number of siblings, level of education, economic status), lifestyle factors (e.g. exposure to alcohol and tobacco), mental state (e.g. symptoms of depression), and psychosocial factors (e.g. work stress). Another medical test is [reformed by a health worker (e.g. medical history); the test also includes physical measures, blood pressure.

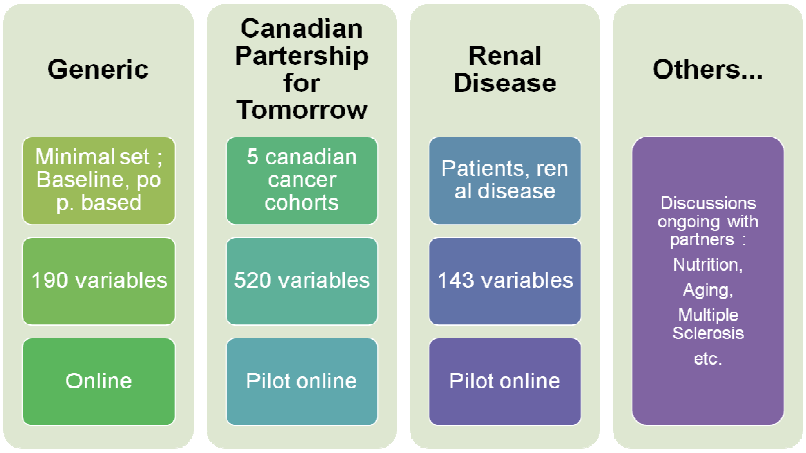
CARTaGENE in collaboration with McGill is currently collecting the environmental and nutritional information. The data collection components include environment and nutrition components.

The DataSHaPER: A tool to support harmonization

Isabel FORTIER, P^{3}G Observatory

Dr. Fortier spoke of the Public Population project in Genomics (P3G) and the concept of harmonization which includes the following aspects: enabling synthesis (pooling); facilitating replication; and improving comparison. The Harmonization Platform entails Primary and Qualifying information, Standard Operating Procedures:

- Questionnaires
- Physical and cognitive measures
- Biochemical measures
- Quality control and processing
- Registries (administrative information, outcomes, environment)



When we want to achieve the proper harmonization, we need the comprehensive description of networks of studies; identification of the information to be harmonized; evaluation of the potential to harmonize information; processing of information under a common format; and the use of the relevant schemas to perform analysis.

DataSchema and Harmonization Platform for Epidemiological Research aim to support the

development of emerging studies and to provide a template to facilitate harmonization and synthesis of information between studies. DataSchema defines a core set of variables to be shared, and offers guidelines for the collection of the targeted information. DataSchemas to date include the following:

Evaluation and synthesis include evaluation of the potential to harmonize and synthesize information between studies; estimation if studies can create the variables of a given DataSchemas; and provision of the algorithms to be applied to achieve synthesis of information.

The aim of the Generic DataSHaPER's Harmonization Platform is to investigate the potential for harmonization between large population-based studies across the world. The study selection criteria include:

- Have recruited or plan to recruit at least 10 000 participants
- Collect biological samples enabling DNA extraction
- Collect comprehensive information on life habits, socioeconomic status and health outcomes
- Provide access to the baseline questionnaire and standard operating procedures used.

THE BTS DIAGNOSTIC – SOCIETAL:

Bridging Disciplinary Modeling

Environment and Obesity

Nancy ROSS, McGill University

Obesity in Canada has increased and is projected to increase even more. Between 981-1996 overweight and obesity (BMI ≥ 25) increased from 48% to 57% among men and from 30% to 35% among women. There are established links to type 2 diabetes, cardiovascular disease, hypertension, stroke, some forms of cancer, osteoarthritis and poor mental health.

What can we do? Professor Ross noted that it is majot population-wide genetic shifts are unlikely in such a time period – look at possibility of "obesogenic environments". Instead, we can focus on the built environment: land use, public transit, foodscapes, availability activity options. Most successful public health interventions historically have shifted environments. Neighborhoods matter: differences in neighborhood resources (availability & price of healthy foods, presence & quality of sports facilities & parks) may influence diet and physical activity. Urban form, availability and quality of sidewalks, perceptions of neighborhood safety, all influence pedestrian activity. Modern suburbs, with land uses that are not easily accessible on foot/bike, may decrease walking or cycling for utilitarian purposes. Obesity is socially patterned. Recent research has argued that urban sprawl contributes to obesity in populations. Long commutes, car-dependent suburban neighborhoods are implicated.

A shaded sidewalk in the new urbanist development of Kentlands.

Obesity appears to be on the rise, and the future looks bad. Unlikely genetic shift, consider role of obesogenic environments. Obesity but not overweight linked to premature mortality of Canadians. Obesity linked to urban sprawl for Canadian men.

How Healthy is the Emerging Markets' Diet? Evolution and Evaluation

Prakash SHETTY, University of Southhampton Medical School and Josef SCHMIDHUBER, FAO

The availability of food worldwide and the structure of the diet (e.g. contributions from sugar and vegetable oil) are projected to increase over the next 20 years. As the countries get richer, the premium food is consumed in larger quantities (i.e. per capita consumptions will go up as GDP is going up). The fat is becoming cheaper which contributes to the availability of fat in a diet. Dr Shetty noted that based on FSB SUAs, the 'national average apparent food consumption' trends in the Emerging Markets' diet indicated:

- Increasing energy intakes; and sugar intakes
- Increasing contribution from animal foods vs. vegetable
- Increasing fat intakes, saturated fats and poly-unsaturated fats, sub-optimal fatty acid ratios
- Improving fruit and vegetable consumption; and
- Progressive convergence of consumption patterns with industrialized countries

State Dependence and Alternative Explanations for Consumer Inertia

Jean-Pierre DUBE, University of Chicago Booth School of Business

The current sources indicate that there is a lot of inertia in choices (i.e. consumers have higher probability of choosing products they have purchased in the past). There are two statistical explanations why one exhibits inertia in the shopping behavior. (i) Structural State Dependence: past purchases directly influence current choices; (ii) Spurious State Dependence: persistent unobserved consumer differences. Dr. Dube suggested interventions to change the shopping behavior of people. Hence, under structural state dependence, we can use marketing to control "future behavior", new products need to overcome this "switching cost", and to do so, we need to:

- ❑ Measure inertia in household panel data for consumer packaged goods choices
- ❑ Find that inertia is robust to unobserved consumer differences and serially-correlated errors (i.e. conclude that we find Structural State Dependence)
- ❑ Explore 3 alternative behavioral explanations: psychological switching costs ("loyalty"); search; learning
- ❑ Patterns in data consistent with switching costs, not search or learning

Further, Dr. Dube highlighted the specific economic processes that could potentially explain the switching between the brands. The baseline explanation is loyalty, i.e. the past purchase of a specific brand changes a consumer's preference for that brand. Such loyalty can be controlled by firms using marketing variables such as a price. But, fist of, there is a need to rule out alternative forms of consumer behavior, i.e. search and learning. When talking about search, we can think of search costs as the cost of recall, location in the aisle, etc. Display advertising is an intervention that temporary lowers search costs for displayed item (e.g. display is quite common in OJ category - 17.5% of items purchased were on display; and there is not much display activity in margarine). When it comes to learning, some learning models feature consumption as a source of information regarding product quality. Under this assumption, past consumption of a brand can affect current beliefs. In some situations, learning can create what looks like inertia (e.g. suppose true qualities are similar among brands; consumer starts with a prior that one brand is better and signal is noisy; slow

revision of prior (due to noisy signal) could create what appears to be inertia). In a model with risk adverse consumers, past consumption tightens the posterior and increases utility. As for the consumer experience, for established products, we might expect that more experienced shoppers would display less \persistence."

Dr. Dube spoke of the marketing implications and these included:

- Straightforward to show that distinction between SD and auto-correlation is important for pricing (under SD, firm can control evolution of loyalty state (i.e. pricing inherently dynamic); under auto-correlation, firm cannot control evolution of serially-correlated errors (I.e. pricing inherently static)
- For new products, marketing needed to overcome the switching cost
- property of loyalty
- But, there is a long-term effect from current marketing investments

Findings of inertia survive a very flexible model of heterogeneity and auto-correlated errors. Evidence supports structural state dependence. Alternative structural interpretations include display data allows us to discriminate between loyalty and generic; search; costly search is not the main source of SD; as might be expected, evidence for learning is limited. Some justifications treat SD as structural. Distinction between sources of inertia has important implications for marketing decision-making.

THE BTS DIAGNOSTIC – INDIVIDUAL

Individual Vulnerability to Overeating and Obesity: A Lifespan Perspective based on Dopamine Gene Variation

Robert LEVITAN, Department of Psychiatry, University of Toronto

Dr. Levitan defined the emotional eating concept as eating in response to emotions rather than hunger; depression, boredom, anxiety; “comfort food”; overeating as addiction; and brain reward systems and dopamine.

When we talk about emotional eating we are talking about brain reward system, especially the chemical dopamine. The limbic system mediates more primitive emotions such as anger, sadness. The prefrontal/frontal cortex is more modern similar to decision-making. So we have a pathway that connects these two parts. Addictions therefore involve both. This brain reward pathway is responsible for natural rewards and substance abuse.

The Dopamine-4 Receptor Gene (DRD4) is expressed in the brain reward pathway. It is also highly variable, i.e. different individuals have different variance. There is a variant of the gene that is hypofucntional (the 7 repeat variant). The 7R makes your dopamine response sluggish. This variant has been selected FOR in human evolution. So is this hypofunctional gene a thrifty variant? Research Question: Is 7R associated with weight gain/overeating/mood in depressed patients who overeat? Patients with this disorder who have this 7r allele do have a higher maximum BMI, and the increase was due to binge eating AND NOT physical activity. We also found out that people with that allele have higher levels of childhood depression score. So people with 7r have low dopamine activity this leads to a combination of negative moods and reward sensitivity, leading to high food intake.

The *MAVAN* project is a 5 year TEAM grant sponsored by CIHR to study how novel gene-environment interactions shape brain development and behavior. It is a multi-site, multi-disciplinary approach with several co-PIs covering developmental neurobiology, genetics, epigenetics, physiology, infant psychology and development, cognition, attachment theory, child and adult psychiatry, neuro-imaging, neuropsychology, sleep and circadian rhythms, nutrition, affect regulation. The project is systematic, longitudinal follow-up with age appropriate measures; it also encompasses basic science/animal models in parallel; inter-generational processes a priority and integrative, collaborative approach. MAVAN shows that girls with the 7R have higher intake of calories and higher fat (boys with 7r eat less fat and calories). In boys with 7r they have higher calories (girls eat less). Boys with 7r eat less protein and girls about the same.

Stress and Appetite

Alain DAGHER, Montreal Neurological Institute, McGill University

There is much evidence to link hunger and eating to addiction. So from childhood we are trained to think that food is an anti-anxiety reducing Dopamine is shown to be important in reward pathway. Stress in the 19th century was not always psychological, but rather as a homeostatic derangement, and stress resulted in an arousal response. One effect of chronic stress is obesity. The role of dopamine in feeding, dopamine is a learning signal that reinforces the behavior that leads to the reward. Conditioned stimuli is initially neutral stimuli that becomes paired with reward that eventually becomes able to result in dopamine release. We are conditioned to seek rewards, and with time there is sensitization, which means a heightened dopaminergic response to stimuli. The role of dopamine is to increase wanting for the regard. It increases your motivation to work for food and engage in risk. So during stressful states, an animal or human is willing to take risk to gain the reward.

When looking at the obesity neuroeconomics, in the developed world, obesity predominantly affects the poor. Unhealthy energy-dense foods are cheaper than healthy foods, and energy density predicts palatability. Type and quantity of food consumed during a meal is determined at the planning stages. Low-income households tend to buy cheaper energy dense foods with added sugar and fats, and avoid more expensive fruits and vegetables. There is a correlation that exists between energy content of supermarket food purchases and daily caloric intake. Forty percent of the recent increase in weight in America can be attributed to reduced food prices secondary to agricultural innovation and policy.

Is hunger an addiction?

- √ Homeostasis
- √ Thirst determined by internal state
- √ Water cannot be stored
- √ Water doesn't induce craving
- √ Easily available
- √ Homeostasis does not fully explain hunger
- √ Calories can be stored
- √ Obtained through effort
- √ Food can induce craving even when satiated *
- √ Hunger is learned (features of addiction

The homeostatic derangement increases risk seeking to obtain reward. That may explain the difficulty people have in losing weight. Even if they are aware of benefits of healthy eating, people are likely to take risks when they feel hunger. If we map out the appetitive brain response to food cues, since there are parallels with smoking and food responses, and if we use the example of smoking, it was found that the appetitive brain regions were more activated after stress. So when stressed, a cigarette smoker is likely to smoke because the smoking behavior is desirable.

The development of feeding behavior has similarities to drug addiction (i.e. it is a learned behavior and not homeostatic). Food and drug cues activate brain areas involved in motivation, reward and attention. Pharmacological treatments of obesity have a risk of causing psychiatric/mood side-effects. Dr. Dagher further spoke of the lessons from tobacco that could be applied to obesity and whether the obesity represented an addiction to food. Lessons from tobacco include the effective measures such as cost increase, prohibition, behavioral therapy, replacement therapy (nicotine gum, patch), and drugs acting on the reward system.

Finally, a hormone of importance is ghrelin. It is a peptide (hunger hormone) that is released by the stomach that works on the brain. Ghrelin is released when the stomach is empty right before scheduled eating times. Ghreline may also be a stress hormone. Ghreline enhanced response to food cues… There is evidence that ghrelin secretion may be under the control of stress response, so when stressed ghreline response might be increased. During periods of stress not only are you hungrier, you are more responsive to food cues.

Genetic Determinants of Eating Behaviors

Ahmed EL-SOHEMY, Department of Nutritional Sciences, University of Toronto

Dr. El-Sohemy described the Toronto Nutrigenomics and Health Study (Measurements, Questionnaries, Metabolomics, Genomics, Proteomics) which looks at genes affecting a variety of pathways that can influence ingestive behaviors. The focus is on the food intake side of the equation (energy expenditure being the other side). Ingestive behavior side includes sensory perception, energy homeostasis (GLUT2), and food reward circuits. GLUT2 gene: detects a rise in serum glucose levels leading to release of pancreatic insulin, but Glut2 is also in brain. A polymorphism scene may be analogous to a knockout.

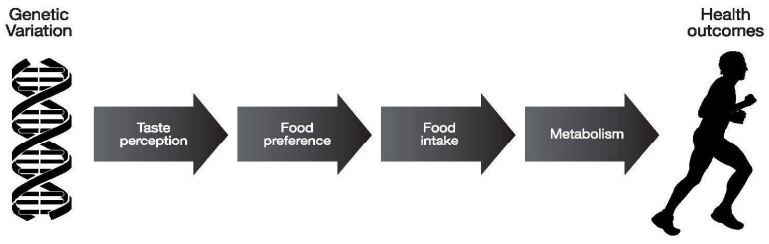


Figure 1

In studying the population of 109 overweight or obese individuals with type 2 diabetes, it was found that carriers with isoleucine consumed more sugars. Protein and fat levels seemed to be the same. Therefore, increase in sugar leads to increase in energy intake, however not a significant level of BMI (but that is because BMI is so multifactorial). A second study (Toronto study) looked at nearly 1000 participants who were generally healthy/lean. It was again found that those with the isoleucine allele consumed more sugar. Again no difference in protein and fat was found.

Another pathway was looked at (food reward circuits) focusing on DRD2. Heterzygotes consumed more sugars compared to others of the homozygotes (women). In men, there was a gene/dose effect. The last pathway was sensory perception (a common variant in the TAS1R2…a sweet taste receptor (ILE191Valine). Those with the valine polymorphism consumed less sugar as they may have had diminished perception of sweet taste. Tas1r2 is highly polymorphic.

Better Diet, Better Health…One Well Informed Choice at a Time. Are we there yet?

David KATZ, Yale University School of Medicine; NuVal

The obesity rates continue to rise. According to S.K. Kumanyika predictions done by SK Kumanyika, among others, who looked at the persistence of current obesity trends projected that should we stay on our current track, by 2048 every adult in the U.S. will be overweight or obese.

Obesity Rates Still Rising (CDC)

- √ Mississippi has highest obesity rate, with 34% of residents obese; Colorado lowest at 18%
- √ Aug. 3, 2010 – More Americans are becoming obese. Obesity rates inched up 1.1% between 2007 and 2009, according to a new report released by the CDC.

We may need to think about the failure in our current policy processes. There are two potential explanations for this failure: either we are doing the wrong thing or we are simply not doing enough.

Dr. Katz introduced a strategy for combating these trends and a practical tool, NuVal, which is based on the notion that if we are going to ask people to take the responsibility for pursuit of health, we must empower them to do so. When looking at nutritional profiles of products, the more nutritious food is often not the most nutritious choice even though these are often labeled as more nutritious.

The Overall Nutritional Quality Algorithm (ONQ), developed in 2006 by a group of scientists, is a labeling system which includes a number of nutrients. The process for generating scores is very elaborative including but not limited to the Nutrition Facts panel. The result is the NuVal Score. A sampling of scores follows the principle: the higher the number, the more nutritious the food (see example charts below).

Apricots	100
Beans	100
Blueberries	100
Carrots	99
Pineapple	99
Potatoes	93
Bananas	91
Grapes	91
Iceberg Lettuce	82

Turkey Breast (skinless)	48
Chicken Breast (boneless)	39
Flank Steak (Beef)	34
Chicken Drumstick	30
Veal Chops	31
Chicken Wings	28
Lamb Chops (loin)	28
Ham (whole)	27
Beef Spareribs	24

The Harvard School of Public Health did a study to measure the correlation between the NuVal scores and all-cause mortality and chronic disease and found that not only there was a significant association (the higher the scores the lower the risk of dying), but also NuVal actually outperformed

the Healthy Eating Index of 2005. NuVal is currently alive in 25 States as well as it is being currently piloted in other states in supermarkets and public schools in the U.S.

THE BTS DIAGNOSTIC:
Computational Systems Sciences

Modeling Approaches: Agent-Based Modeling

Ross HAMMOND, Brookings Institution

Obesity is challenging for science and policy because of multiple and interconnected levels, mechanisms, and actors that operate at multiple spatial and temporal levels. This is characteristic of complex adaptive systems.

In order to understand the diverse fields brought together by the BtS Roadmap, there are tools and modeling approaches. Dr. Hammond spoke of one such tool - Agent Based Modeling (ABM). We build artificial society of individuals (agents) that interact based on some simple rules. The agents could be people, firms, cells, neurotrasmitters, etc. They are placed within some sort of context and we then observe social patterns that arise.

Advantages of such modeling approach are: rigorous, accessible to decision makers, stakeholders (don't need advanced mathematics), hence it can be used to policymakers, and people from different fields; less restrictive assumptions (can incorporate heterogeneity, explicit space, adaptation, long time horizons, and multi-level analysis); the focus on mechanisms behind observed patterns and correlations.

The ABM approach has been applied in a wide variety of fields, although relatively new to public health (has does well for infectious disease). Policy relevance: these models can provide a virtual laboratory to test policy interventions, especially when it is expensive, too complex, or unethical to test in a real situation

ABM in relation to obesity/chronic disease is practical in the following ways:

1) Ability to capture rich and changing social/environmental context and heterogeneity
2) Simultaneous modeling at multiple levels of scales combination of both above and below the skin
3) Dynamic modeling, allowing for adaptation and change across the life-course

Group Model Building to Support Collaborative Stakeholder Engagement

David ANDERSEN, University at Albany

Dr Andersen spoke of stakeholder engagement, system mapping, and system modeling.

The System Dynamics Group Model is a form of group decision support, involving a group of stakeholders with a complex problem (all done with system dynamics models):

- Group facilitation
- Model building and refinement in public

- Simulation of scenarios and strategic options
- Extensive facilitated discussion and analysis
- Facilitated policy design and decisions

Important principles include: requirement of a properly organized modeling team; attention should be paid to scripts (which are time organized into a 15 minute block for the whole 2-3 days, that introduce simulation through paper/pencil exercises to extract mental models from stakeholders); and improvisation.

Much of Dr. Andersen's work is focused on how to design these scripts to get mental models down from all stakeholders to simulate the problem and to manipulate the various systems in the problem to find a solution.

System Dynamics Models are:

- Aggregate, continuous-time simulation models
- State-determined and feedback rich
- Mathematically—sets of non-linear simultaneous differential equations
- Incorporating social, biological, managerial, and behavioral phenomena within a closed causal boundary
- Often supported by icon-oriented and user friendly software such as Vensim, Powersim, or I-think

What is Group Model Building? Components of the process include:

- Problem definition meeting
- Group modeling meeting
- Formal model formulation
- Reviewing model with model building team
- Rolling out model with the community
- Working with flight simulator
- Making change happen

Health, Agricultural and Economic Effects of Adopting Healthy Diet Recommendations

Richard SMITH, Leverhulme Centre for Integrative Research in Agriculture and Health

Dr. Smith presented a particular form of modeling called computable general equilibrium (CGE), an economic model, and in particular, a study relevant to obesity that uses CGE (to be published in the Lancet shortly).

There is a transition to diets high in fat/sugar around the world, causing global public health concern (NCDs), a food consumption being a major modifiable risk factor. There is also a globalization of agri-food industry which profoundly affects production, distribution, and consumption. Furthermore, there is a disconnect between healthcare and agriculture experts, industry. This paper in the Lancet journal attempts to connect these two disconnected sector. Agri-food systems are intimately involved, but agriculture & health sectors are disconnected. This paper tries to see what would be the health and economic outcomes if everyone adopts this "Healthy Diet". The paper outlines the examples of a case study done in two nations: UK (high-income, predominantly

WHO recommendations for a 'healthy diet':

√ 15-30% total energy as fat; **saturated fat should be under 10%** and trans fatty acids under 1%

√ 55-75% total energy as total carbohydrate; added sugars should be under 10%

√ 10-15% total energy as protein, mainly from plants

√ 5g/day of salt

√ >400g/day of fruits and vegetables

importing country, increasing NR-NCDs), and Brazil (mass agricultural producer and major global exporter of food products including animal food products, with a population that is undergoing a rapid dietary transition).

Dr. Smith further articulated the economic impacts of 'healthy diet' methods, precisely, four scenarios based on application of the three animal source food strategies:

- UK domestic impact (effect only on UK domestic demand for animal source foods)
- Brazil domestic impact (effect only on Brazilian domestic demand for animal source foods)
- Brazil international impact (effect only on export demand for Brazilian animal source foods)
- Brazil combined domestic and international impact (effect on both Brazilian domestic and export demands for animal source foods)

Results (healthy outcomes) illustrated the reduction of 22% of DALY and 27% of premature deaths in one year for UK; and reductions of 2% of DALYs and 3% premature deaths for Brazil (results are less because Brazil started with a much healthier baseline diet). The shock model used was of three kinds (1) reducing consumption of all animal source foods (2) meat only (3) dairy only. These are essentially shocks because it changes demand.

If we combine economics with health outcomes: the labour supply increases due to reduced mortality; labour productivity increases due to reduced morbidity; domestic consumption of agricultural products reduces; and there is reduction of import and exports. The study ran four particular scenarios: (1) UK domestic impact (effect only on UK domestic demand for animal source foods) (2) Brazil domestic impact (effect only on Brazilian domestic demand for animal source foods. (3) Brazil international impact (effect only on export demand for Brazilian animal source foods) (4) Brazil combined domestic and international impact (Effect on both Brazilian domestic and export demands for animal source foods). The results (economics) indicated the following: cost impact on economy is less if intervention is on reducing across the board and not just meat or dairy; Brazil does worse than the UK due to its large percent of population depended economically on agriculture. Unfortunately, the health gains do not offset economic costs. The sectoral results included: the sectors that get hit the most are the meant, animal, dairy ones, but grain (crops) gain quite a bit; the rest fluctuate (when people don't spend that much on meats/dairy, they spend money elsewhere).

Dr. Smith discussed the limitations and assumptions of economic model. When estimating long-term structural implications, impact on exports to Brazil scaled back from 85% to 74% because maximum model could interpret. One question remain, what will substitute for the reduced production and consumption of meat and dairy products? Another implication is the lack of feedback loops (e.g. lost livelihoods are associated with negative health impacts).

Major emphasis on securing a 'healthy diet' will affect population health and the economy. This study suggests that UK will have high health benefit and low cost impact. Brazil will have low health benefit and high cost impact. Policy that is focused on reducing all animal source foods creates less economic impact than reducing meat or dairy products alone.

Understanding impacts on *both* health and wealth, and of winners and losers, is critical to securing a sustainable food policy to maximize health benefits while minimizing risks. Although analyses are simplistic, highlighting health and economic effects together illustrates **the need to consider systems interactions** between different policy sectors, and at different levels of impact in developing upstream policies to tackle NCDs.

Splash: Smarter Planet Platform for Analysis and Simulation of Health

Peter HAAS, IBM Almaden Research Center

Dr Haas talked about the IBM's new and ambitious Splash project for analysis and simulation of health which aims to create a platform and service through which IBM and partners can integrate existing data, models, and simulations to gain insight needed for complex decision making related to health policy, planning, and investment. So, the key research question is: "Can such integration of independently created deep domain models be made feasible, practical, flexible, cost-effective, attractive, and usable?" The value of such a project is the new insights from mashing up heterogeneous expert models; high quality results from collaboration, interoperability, and integration; and rapid exploration of a large number of alternative inputs and outcomes.

Example of the model mashup on chronic disease included 5 different models: buying and eating (agent-based simulation model), recreation (stochastic queuing model), transportation (macro-scale simulation model), store location (optimization model), and BMI model. Such a model could help a regional city planner who is trying to answer the following question: what is the most cost-effective policy for reducing population BMI? The possible examples include: give tax incentive to a large supermarket chain to sell low-cost fruits and vegetables; build recreation facilities; fund an education campaign.

Even the broader health sector cannot deliver optimal health outcomes on its own. Policies and practices in education, housing, transportation, and agriculture have far-reaching health effects, but are not engaged or evaluated for those outcomes.

SESSION 3 Collaborative Stakeholder Engagement

PLACING HEALTH ON THE STRATEGIC INNOVATION AND COLLABORATION AGENDA OF BUSINESS
At the National and Global Level

Keynote Address
Hank CARDELLO, Hudson Institute

Building the Business Case to Fix Obesity: The Forces Derailing Solutions to Obesity

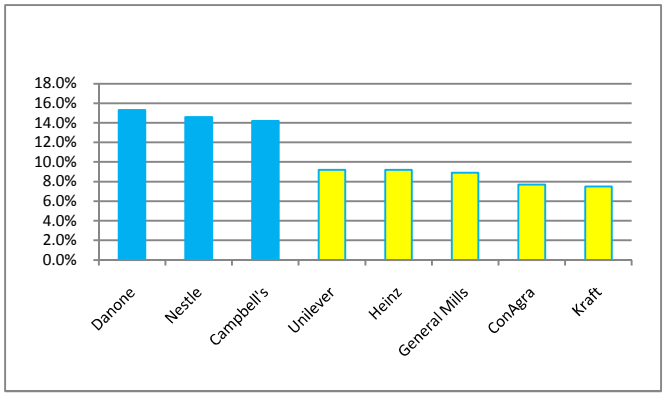
In his keynote address, Mr Cardello articulated the prospective from the food industry to understand the barriers are to make the certain changes to reduce the obesity epidemic. What's not working? It's a three-way tug of war between the industry, research community and the consumer.

A Three-Way Tug-of-War Hindering Progress: The Motivators Behind the Process

Consumers are not aligned with fixing obesity and it has the following implications: relying on consumers to change behavior is an uphill battle (less than 1/3 'walk their talk'; 'one-size-fits-all' education programs unlikely to succeed); regulatory approach will continue to meet with fierce resistance; unless proposals consider business performance metrics, full industry cooperation will be elusive.

Why Would Food Corporations Change?

1. Improved performance metrics: profits, sales, market share and/or reputation
2. Retention of consumer loyalty
3. Get ahead of steamrolling regulatory juggernaut
4. Increasing Regulatory Pressures



The Hudson Institute Obesity Solutions Initiative, its overarching goal is to accelerate the reduction in obesity rates for children and their families (the focus is on calories). Since 1970s, the calories available per person went up by 30%.

To develop the definitive business case that compels food corporations to expeditiously reduce the Calorie Footprint includes the following key elements:

- Develop a set a **metrics/findings** that aligns corporate behavior with the need to address obesity:
  - Determining the true business costs of not addressing obesity
  - Demonstrating the financial upsides of adopting healthier practices
  - Ascertaining the impact on customer loyalty and repeat purchases
- Devise **policy platforms** that prevent protracted industry resistance to change and ensure quickened cooperation
- Compile **case histories** proving that modifying practices yield tangible benefits.

Example outcome products include:

- "Vulnerability Index" - exposure of major food corporations to changing dynamics regarding health & wellness.
  - Regulatory vulnerability
  - Reputation risks
  - Expected margin erosion
  - Gap between company portfolios and Yankelovich "Well/Fair" Consumer
  - Impact of obesity on productivity and medical costs
- Innovative Obesity Policy Initiatives that break the current logjam between industry and health advocates.
  - Incentives as a tool to exponentially lower calories sold
  - Alternatives to "fat" taxes
  - Rewarding increased marketing spending behind nutrition/portion control messages to children

- "Metric Motivator" financial charts highlighting superior performance by companies adopting "healthier" products and practices.
  - Portfolio composition of healthier brands
  - Return on Sales
  - Stock price trend
  - Net Income trends
  - Gross Margin trends

A “Best Practices Bible” depicts corporate initiatives to market healthier products that resulted in improved performance outcomes. Examples include Novel bonus structure employed by General Mills; Applebee’s 550-calorie or less entrees; and Danone’s shedding of less healthy businesses to improve profits. In sum, Food Corporation engagement is crucial to solving obesity. Best approach is to show how they can improve their most important metrics.

How to Influence Behavior to Choose a “Healthy” Lifestyle

Joanna CASTELLANO, Q:Quest Inc.

The presenter could not attend the workshop. The following is based on her slides.

The Meaning of “Health” is relative. Everyone has their own definition of health (*what healthy is to one person is not the same to another; what is ideal is not what is achievable).* The meaning of Health is often linked to lifestyle – which involves mind, body, spirit. People want to feel in control of their lives - to lead a healthy lifestyle - however they define it, and believe that too much is out of their control - when life knocks them off balance they seek ways to re-balance.

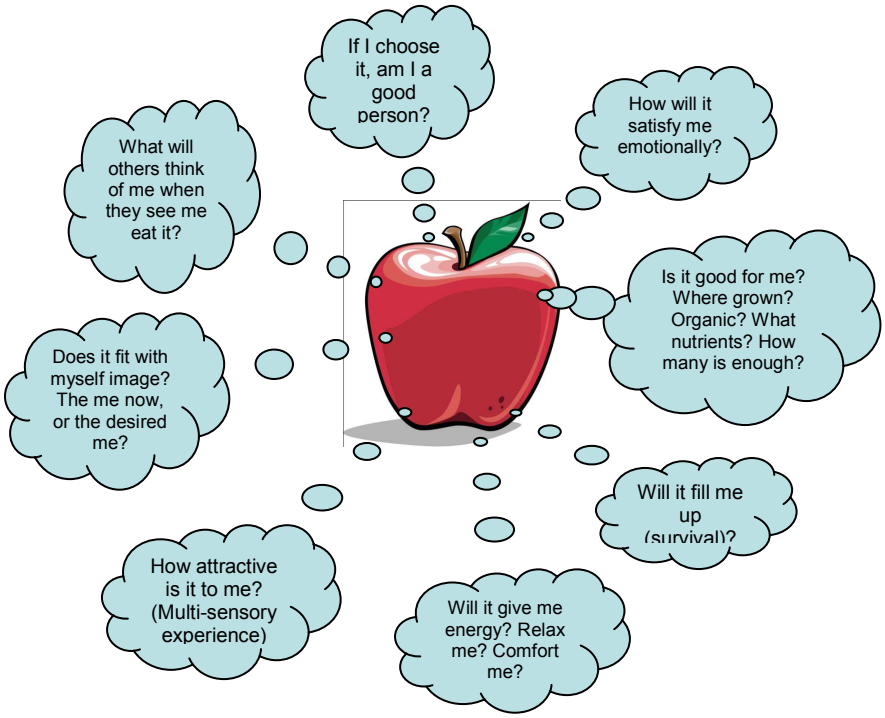
There is no one “right way” - it’s not an absolute behavior. If people make “bad” choices in one part of their lifestyle, how do you influence behavior to look for ways to “balance” that with good choices? It’s about “variability’ and understanding their pendulum of balance with the least amount of change in their “status quo”.

We need to understand the underlying motivations for the consumers in each culture. We believe there is a direct Healthy Happy link. There is a Look Good/Feel Good (Live Well)/Happy state that we need to understand at a deeper level.

It is imperative to engage industry and government, as well as health care practitioners and educators:

1. First understand what’s important to consumers - how they are motivated individually, socially, culturally and by cohort - *What do they want and why?*
2. Uncover the language – words, symbols, body language, sources – that will influence them to make healthier choices and develop healthy habits - *How do they want to get it?*

Consumers' Hierarchy of Needs:



Engaging Stakeholders in a Complex Policy Environment

Robert PEDERSON, European Public Health and Agriculture Consortium

Mr Pederson introduced the EPHAC – a process-based coalition of public health organizations (European and UK-based) advocating for healthier, more sustainable Common Agriculture Policy (CAP). CAP is the part of a joined up approach targeting healthier environments and adequate public policy to tackle chronic disease and inequalities in health. The EPHAC's key objective is to provide high level of "health intelligence" to decision makers; engage with policy makers in a constructive manner with relevant EU institutions and stakeholders; and actively pursue strategic alliances that promote EPHACs goals. The work of building strategic alliances includes engaging with other civil society organizations and sector representatives (Food Declaration), developing good working relations with the government bodies (DG AGRI and DG SANCO), and working actively with the WHO and WHO Action Network on Diet and Social Inequality.

The EU School Fruit Scheme is the illustration of how health and agriculture policy can work together and how we can get agriculture, public health and education work together. This process includes not only the "good quality" evidence, but also collaboration between business (FV) and civil society (health), political champions, transparent and engaging legislative process as well as EU SFS expert and stakeholder groups.

Another example of EPHAC's engagement with stakeholders is the reformed CAP. EPHAC is also deeply involved in Agriculture and Rural Convention (ARC) for the new European Agriculture Policy which includes innovative negotiation process between stakeholders for a reform of the CAP. The

aim of ARC 2020 is to create a strong and influential voice of civil society for a new European Common.

New collaboration entails weak civil society sector, strong academic and government; capacity-building workshop to engage stakeholders; new objectives for a new CAP; and identifying potential partners. CAP is often used to manage the crisis (e.g. current crisis in Dairy Sector; feed crisis; Global Food Security crisis) and with such the short-term actions are taken, but it should not impede on our long-term goals.

There are converging agendas: Global Food Security, Climate Change, and Chronic Disease. This means that we need to move both the consumption and production patterns.

Innovating for Research: Proprietary, open source and open access mechanisms

Richard GOLD, Faculty of Law, McGill University

Dr. Gold spoke about what we can learn from science to answer some of the urgent questions. There are always a lot of actors with different types of answers to the problem that are working through different modes and different networks that often don't connect. So, there is an obvious need for collaborative research. Collaborations have several advantages for biomedical innovation:

- Risk sharing: particularly with respect to technologically difficult problems among leaders, academics, etc.
- Cost sharing: expensive equipment, database maintenance
- Cost reduction: avoid duplicative research, put fewer research subjects at risk
- Accelerate research through knowledge sharing

One type of collaboration is the open source solution, is based on borrowing the mechanisms of the open source movement. Open source is often a good solution when dealing with informatics (e.g. PG3) where IP costs are low and community norms are high. Certain factors limit the effectiveness of open source in biomedicine and these are: innovation costs are higher; regulatory compliance is very expensive; IP costs are significant; different mix of actors with different goals; and effect of different open source licenses.

Even where open source is effective, it faces increasing challenge from patents, leading to the need to supplement open source with patent aggregators and licensors (e.g. Open Innovation Network). These problems are significantly higher in drug development. The Open Access, the model that is underexplored in agriculture, is one of the suggested models to use.

In 2003, Chesbrough put forward the concept of open innovation, an alternative solution, as innovation that takes place through permeable firm boundaries that allow the inflow and outflow of knowledge and patents. In 2009, Weigelt and Edwards have taken this further, arguing for greater permeability between public and private actors without patents through open access (not to be confused with open access publishing). Open access depends on the *absence* rather than presence of intellectual property. All information generated by research collaboration is contributed to the public at the same time as it is given to its members. Anyone can use, modify or improve results. Enforcement depends on contracts and norms rather than intellectual property.

The Structural Genomics Consortium is an example of the open innovation. It has been initially established as a public-private partnership to determine the 3D structure of proteins, the SGC has expanded to include the development of probes for epigenetics research and has plans to conduct an open access clinical trial. It has funding from governments, foundations, industry and universities. Management structure gives those who pay a say in research priorities but not in any knowledge of the research activities or results. This commitment is currently being translated into a set of operational principles. Key feature is its open access policy: "The SGC and its scientists are committed to making their research outputs (materials and knowledge) available without restriction on use. This means that the SGC will promptly place its results in the public domain and will not agree to file for patent protection on any of its research outputs. It will seek the same commitment from any research collaborator."

Concluding Keynote Address

Alban D'AMOURS, International Confederation of Popular Banks

OLD AND NEW BUSINESS MODELS TO WEAVE HEALTH AND SOCIAL ISSUES INTO BUSINESS AND FINANCE

At the last World Economic Forum, Klaus Schwab called for greater leadership in creating innovative business models, new technologies, reshaping consumer behavior and creating job opportunities that are driven by sustainability. We are invited to "improve the State of the World", to rethink, redesign and to rebuilt it. This is a major task. The good news is that we don't start from scratch. The cooperative business model has responded to the needs of many for more than 150 years.

The current economic and financial crisis has made such re-thinking necessary and urgent. Already, some of the directions in which such re-thinking should move have been identified. Several social scientists are already arguing that, in the words of Joseph Stiglitz "a massive re-thinking of the role of the government and of the market is necessary to recast the role traditionally assigned to the various types of enterprises". Stiglitz argues that it is necessary to "find a balance between markets, government and other institutions including not-for-profit and cooperatives" with the objective of building "a plural economic system with several pillars to it". Affirming economic pluralism means abandoning the preference for a single type of ownership, the one driven by profit maximization and instead asserting the value of diversity.

The United Nations General Assembly did assert it by declaring 2012 "International Year of Cooperatives". In the aftermath of the economic and financial crisis, it represents a historic opportunity to promote other business models like the cooperative one. This UN resolution recognizes the many ownership models around the world. This plurality of models within our capitalistic environment must become the basis of a new economic order: the cooperative business model becomes a counterweight in the search of a new equilibrium.

The characteristics of the cooperative business model are unique and widely shared throughout the world. Quebec, for instance, having been a very fertile environment for cooperative development in the past is becoming a leader in promoting health-coop. Desjardins Group, the largest cooperative financial group in Canada, has a business model with the objective of global and sustainable development. At the same time, Desjardins' many initiatives aim to help funding regional and cooperative development, to finance start-up of young entrepreneurs, or help poor people with small loans attached to an obligation to engage in budget education. Along the way, Desjardins refined the model and enlarged the scope of its existing knowledge.

The cooperatives have to know how to promote one of the fundamental characteristics of the cooperative business model, its service logic (source of sustainability and resilience) instead of the absolute quest for profit; how to protect and promote the relevance and modern aspect of their democratic governance; how to maintain a healthy tension between solidarity and individual responsibility; how to differentiate between the performance of the cooperative business model from that of the venture capital model (emergence of a new competitive environment where these two models must compete at a different level); how to balance financial and cooperative performance; how to stay close to people and respond to all needs, large or small; how to be part of the market, knowing its rules and taking on the competition; how to prioritize sustainable development, which takes into account economic, social, environmental and ethical aspects, over business plans.

We live in a world that is in search of values. We observe that the problems we are currently experiencing are mainly the result of irresponsibility, greed, poor ethical behavior and the act of putting money before people. Cooperatives are built on a set of values that are contrary to those mentioned above. Cooperatives measure their performance differently, they are modern, they escape the tyranny of quarterly reports, they belong to user-owners, they create a new kind of wealth, they have strong ties to their communities, and they inspire confidence. They share a business model that is a real option in today's economic and financial universe. We should all be aware of the incredible force they represent. Without awareness of this force on a global scale, the world will miss a huge opportunity to weave social and economic issues into a new look over human needs.

THE WAY FORWARD

The BtS Roadmap for Complex Collaboration

DAY 2 of the workshop | September 30, 2010

On the second day, participants formed seven parallel working groups to develop projects for complex collaboration and/or innovation in science, policy and/or action to advance the BtS Roadmap. In this context, participants were asked to consider the following:

Key collaborators that should be engaged in the proposed initiative

Key enablers that would support the realization of the initiative

Challenges and barriers that would impede the realization of the initiative

Best approach (roadmap) to achieve the desired outcome

The designated leaders from each working group were asked to report back on the results during the plenary discussion. The key initiatives that emerged during the roadmaps development discussions are summarized in next section.

GROUP

1

Objective

To bridge metrics from agriculture, manufacturing, retail, media, consumption with nutritional information for better health and economic outcomes.

Intended Outcomes

- √ Ontologies to allow the integration of data from multiple sources
- √ Opportunities for joint work based on current grants
- √ Proposal for further collaborative research

In this group

- ❑ David Buckeridge, McGill University
- ❑ Karen Watson, The Nielsen Company
- ❑ Arash Shaban-Nejad, McGill University
- ❑ Alan Evans, McGill University
- ❑ Catherine Boileau, Université de Montréal
- ❑ Philip James, IASO
- ❑ Yu Ma, McGill University
- ❑ Philippe Fines, Statistics Canada
- ❑ Sanjay Dhar, University of Chicago
- ❑ Vural Ozdemir, McGill University
- ❑ Martine Pageau, MSSS
- ❑ Eric Robitaille, INSPQ

A MULTI-NATIONAL, MULTI-SECTORAL, MULTI-DISCIPLINARY FRAMEWORK

For Data to Evaluate and Monitor the Influence of Added Sugar on Health

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Initiative enablers and barriers/challenges to achieve the intended outcomes:

- Evidence supporting the influence of added sugar on health
- Understanding of potential points of influence in controlling added sugar (and the evidence for the likely success of each intervention)
- Initial Framework: Sugar produced (see 'Agricultural' in specific questions below), added to food and drinks, routes of input of these items (stratified by sub-groups), changes in input over time, variation across population sub-groups
- People to help identify data sources (the network at this meeting!) –Phillip James is a great start (with links to people – James Hospedales in Mexico, Carlos Montero at University of Sao Paolo in Brazil, etc.)
- Identify in each country key political influencers of any policy to reduce sugar

Challenges and barriers in moving forward:

- Identification/discovery of data -- rely on our networks of experts
- Access to data, especially agricultural data
- Highly politically charged topic
- Quality of data (e.g., food intake)
- Inconsistency of data across countries (e.g., conceptual variation, availability)

Inconsistencies:

- Need for standards (start with countries that have good model)
- Conduct mapping of available data to identify dimension
- Identify concepts that should be measured and review how countries capture this data

- Politically charged
- For each country, identify who might sabotage this and identify how to influence them

What is needed to achieve the intended outcomes:

- List of potential uses for policy makers and others working toward obesity
- Understanding of how data can be harmonized
- List of biobanks that can be used – understanding of nature/nurture factors
- Links between biobanks
- Correlation of variables that have not been correlated in the past
- Database use models → societal
- Sugar consumption → obesity (added/non added in food/drink)
- Understanding of the role of agri marketing

Relevant questions to achieving the outcome:

What are the principle public and private databases that could/should be connected through this initiative?

- Neilson: social networking, online behavior, mobile behavior
- USDA: description of ideal production landscape in USA -- agricultural response to a healthy diet (congressional data on funding?)
- Biobanks: Canada (Cartagene), India (?), Canada (LORIS).
- Agricultural: Sources (sugar cane, sugar beet, cereal fermentation -- not for alcohol or fuel production) have changed over time, net import an export are available over time (FAO for 30 years), presence of subsidies over time

What new information techniques need to be leveraged to accomplish the intended outcome(s)?

- Ontology to define concepts and relationships, link concepts to data sources in different countries
- Global sweetness map (gsm) for people to understand amount of added sugar in products in their region
- Mobile devices for access to 'gsm' and ability for people to add their perception

What are the key concepts that need to be understood?

- Influence of individual factors (e.g., genetic, psychological) on desire to consume and metabolism of sugar
- Role of individual heterogeneity in developing policies
- Agricultural cycles - how are they measured and what is their influence on marketing
- Motivation – why business add more sugar into products.

Roadmap (Milestones for the next 12 months)

The outcome would be achieved by completing the following milestones:

- Create the team
  - Find the funding (corporate support or applying for funds)
- Systematic literature review of the field
- Design Conceptual Framework
  - understand economic impact and alternatives
  - ontology modelling
- Create the Database
  - decide the format of the data
  - classify database according to what they measure
  - inventory of existing data
- Data Analysis of Existing Data
  - compatibility of various data
  - converting data into standard measures
  - identify possible links between data
- Data Collection (New), if needed

- Data Processing

GROUP

2

Objective

To better integrate and compare knowledge across different studies.

Intended Outcomes

- √ New concepts and methods for EREs to allow for information from different studies to be compared
- √ Opportunities for joint work based on current and future grants

In this group

- ❑ Alain Dagher, McGill University
- ❑ Ross Hammond, Brookings Institution
- ❑ Robert Levitan, University of Toronto
- ❑ Denise Avard, McGill University
- ❑ John M. Coates, University of Cambridge
- ❑ Ahmed El-Sohemy, University of Toronto
- ❑ Matthias Faeth, McGill University
- ❑ Lesley Fellows, McGill University
- ❑ Reut Gruber, McGill University
- ❑ Thomas Shultz, McGill University

CONCEPT AND METHOD DEVELOPMENT FOR ERE

(Environment Responsiveness Endophenotype) with Individual-Level Agent-Based Model

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Relevant questions to achieving the outcome:
How do we test the agent-based model for obesity?

- Phase 1a: Use existing data
- Phase 1b: Collect new data
- Phase 2: Run the model to test predictions and generate new predictions
- Re-iterate
- Design social agents that are biologically and socially realistic

Can we design a risk index that represents vulnerability?

What is needed to achieve the intended outcome: Outcome measures:
Weight; Waist-Hip; %Fat (DEXA); MRI; Leptin; Eating behavior

- Questionnaires
- Supermarket credit card (purchases)

Roadmap (Milestones for the next 12 months)
The outcome would be achieved by completing the following milestones:

- Generate a reasonable ABM
- Test ABM using existing data (e.g. MAVAN)
- Collect new data-based on model predictions
- To write a grant application to generate an agent-based model of over-eating in the real world based on empirically defined agents.

GROUP

3

Objective

To consider how to use the novel participatory modeling techniques to inform the adoption of "healthier diets" (particularly in Canada, UK, and India)

Intended Outcomes

√ The use of credible ecological integrative modeling capabilities that can inform and be responsive to key stakeholders

In this group

- ❑ Jeroen Struben, McGill University
- ❑ David Andersen, State University of NY
- ❑ Richard Smith, London School of Hygiene
- ❑ Ray Bollman, Statistics Canada
- ❑ Michele Cecchini, OECD
- ❑ Sylvie Desjardins, PHAC
- ❑ Jean-Frederic Lemay, Équiterre
- ❑ Kakali Mukhopadhyay, McGill University
- ❑ Jonathan Salsberg, McGill University
- ❑ Martine Pageau, MSSS
- ❑ Prakash Shetty, University of Southampton
- ❑ Didier Sornette, ETH Zurich

PARTICIPATORY SYSTEMS DYNAMICS MODELING OF

Agriculture and Food Market Transformation for Designing, Implementing and Monitoring Local, National and Global Policy to Prevent Obesity and Chronic Diseases

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What is needed to achieve the intended outcome:

- Looks like a consortium
- Splash Pilot study (simulation as "IBM grand challenge")
- Bring it to Policy Panel
- Potentially for Government to Canada
- Develop a model in a particular area first, level (NGOs/corporate/...)
- Aligning model goals has a political challenge (e.g., OECD 33 countries need to agree upon an activity)
- Three-year horizon (food/agriculture related)
- use food policy models as test-site (Peter Haas)

Roadmap (Milestones for the next 12 months)

The outcome would be achieved by completing the following milestones:

- Contact IBM-Splash to define Health Canada focused nutrition models (CGE, SD, OECD) as pilot project open to other models (David Andersen)
- Make economic case by use of three models for the 2011 UN Summit
- Use 2013 Finland meeting on New Governance across ministries. Policymaker-model consortium to compare model and share insights, challenge assumptions, agri-food related
- Create the team
  - A team leader/program manager has to be identified
  - There are content capabilities (e.g. OECD, McGill CGE, SD, LS: CGE), but the integrative process needs to be led by someone
- Break down the initiative in smaller bites and identify clear deliverables for each bite

GROUP

4

Objective

To develop common methodological approaches to better understand the community dynamics role in reducing childhood obesity

Intended Outcomes

- √ Use of novel research and community building techniques
- √ Decision support tools to assist community stakeholders
- √ Common methodologies and approaches for a better understanding of community dynamics

In this group

- Christopher Comeau, Collaborative Transformation™
- Rick Blickstead, Wellesley Institute
- Avi Friedman, McGill University
- Harry Rutter, University of Oxford
- Vikram Bhatt, McGill University
- Martin Cloutier, Université du Québec à Montréal
- Samer Faraj, McGill University
- Ratna Ghosh, McGill University
- Dora Koop, McGill University
- Johanne Laque, INSPQ
- Deborah Andersen, State University of NY
- Ann Macaulay, McGill University
- Eric Myles, Quebec En Forme
- Brenda Roche, Wellesley Institute
- Nancy Ross, McGill University
- Terry-Nan Tannenbaum, MSSS
- Ljubica Vuckovic, Agriculture and Agri-Food Canada

PARTICIPATORY SYSTEMS DYNAMICS MODELING OF

Community Transformation for Designing, Implementing and Monitoring Local, National and Global Policy to Prevent Obesity and Chronic Diseases

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Enablers to achieve the intended outcomes:

- Who is responsible?
- Who will become catalyst, collaborator and connector?
- Government can be the chief responsibility agent?
- Government responsible for the public good.
- We are talking about all of the population.
- Is the government going to enable the individual to make the changes needed?
- The business is catering to the “wants” and “needs” of the consumer.
- Re-framing the objectives is part of what needs to be done (drive demand from individuals will impact political – constituents; government – public good; industry – consumers)
- Re-frame away from personal responsibility issue (in terms of the environment in which people are making their decisions)
- The role of the government is to step the stage about the knowledge; if you regulate you will maybe move along a new pathway;
- **Big models** (“cost” defined)
- **Big ideas**: If the tobacco model worked, can we use the same idea for obesity? (can we use the same type of idea)
- Re-framing: campaigns to show impact of obese population on the not obese); maybe develop incentive schemes; determinants causing obesity;

- Is it re-framing the rights and responsibilities of individuals?
- Building social movement around this
- Create a tool that allows the issues to become explicit for civil society (A narrative tool?)
- Tools for Multi-Sector collaborative stakeholder engagement
- Big models
- Social movement
- Inter-relationships re: responsibilities
- Four levels of community
- Strategic and tactical plan
- Implementation

What is needed to achieve the intended outcome

Deliverables to achieve the intended outcomes:

- Change government (fixed mandates and silos)
- Government can be enabler and partner
- Change multi-sectoral engagement model (need people who know the interconnection
- Partnership with government (risk shared and time to do it, power to do it)
- Obesity as part of an overall health mandate
- "The Responsibility Deal": academics become convenors (thinking), government becomes enabler , industry do-er, broader community does interventions

Roadmap (Milestones for the next 12 months)

The outcome would be achieved by completing the following milestones:

- Call for an industry summit to see their take on the obesity problem and create a forum discussion about "quality of life" vision for civil society
- Talk to the people doing that stuff in this project and see what they need
- Develop models that link obesity/social determinants of health/sustainable development/climate change (what would it take to have "healthy community")
- Map out and identify relevant "communities" and routes into them
- Review and summarize the evidence and expertise on community/multi-stakeholder engagement and write a manual
- Define the expected outcomes and timelines
- Define the responsibilities and expected outcomes of each sector
- Mobilize the stakeholders and work on options for social movement (develop and overall "obesity is bad for all of us" message)
- Come up with a plan on how to reform/change government
- Document economic cost of obesity
- Survey of how online communities and new forms of social networking are being used to share knowledge and action plans about obesity

Proposed recommendations:

- Paper on stakeholder engagement road map to end obesity and implementation tool
- Three main parts: Multi-stakeholder engagement; triple Helix model and Big Idea

GROUP

5

Objective

To explore two innovations (X-Prize/Social Business models) that can contribute to reducing food and nutrition insecurity

Intended Outcomes

- √ The use of x-prize to identify and implement solutions to food and nutrition insecurity
- √ The use of social business to identify and implement solutions to food and nutrition insecurity

In this group

- ❑ Jan Jorgensen, McGill University
- ❑ Jaykumar Menon, X-Prize Foundation
- ❑ Manon Cormier, Danone Inc.
- ❑ Philip Oxhorn, McGill University
- ❑ Omar Toulan, McGill University
- ❑ Rickey Yada, AFMNet

FOOD SECURITY THROUGH INNOVATION

How to see the world without barriers

Description of the intended outcomes:

- X-Prize foundations (examples):
  - Fast food with healthy options / healthy division
  - Home cooked meals delivered home
  - Getting agricultural input to the poorest farmers
  - Increase length of stay of doctors in poor areas

Enablers to achieve the intended outcomes:

- Intellectual resources
- Culture
- Database access (mobile phones)
- Evidence based policy
- Representation issues
- Access to land
- Women education

Challenges and barriers in moving forward:

- Current structure is profitable
- Unhealthy food are addictive
- Regulatory frameworks
- Culture
- Regulations
- Subsidies
- Distribution channels
- Mindsets
- Genetic component
- Access to mobile communications (bottom 20%)
- Lack access to inputs

What is needed to achieve the intended outcome:

- services
- structures
- frameworks

Relevant questions to achieving the outcome:

What new types of incentives might be required or can we go about identifying the right incentives?

- Local incentives
- Status incentives

What new business models might be required or how can we go about identifying more effective business models?

- Micro-credit for agricultural inputs (to pay for seeds and fertilizer)
- Social business model (for profit is not ruled-out)
- COOP

Roadmap (Milestones for the next 12 months)

The outcome would be achieved by completing the following milestones:

- X-prize: Define the metrics for micro-nutrients deficiencies and for community
- X-prize and Agriculture: Fund raising
- X-Prize and Agriculture: Communication plan
- Agriculture: Leader and Team

Next Steps:

- For X-Prize :
  - For X-Prize team to tune the design
- For agriculture inputs :
  - Search for examples to understand success or failures
  - Partner with seed companies or COOPs (no single partner)

Proposed recommendations:

X-Prize – how to see the world without barriers

- Community award
- 5 years to achieve the highest decrease in micro-nutrient deficiencies (with a minimum of 25% reduction)

Social business – use micro-credits for agriculture inputs

- Ensure re-payment can be adapted to crop season and possible crop failure (insurances)

GROUP

6

Objective

To draft a position paper on a strategy to study how governments and business can develop new models of governance in global value chains to address the growing variety norms, standards, and practices.

Intended Outcomes

- √ Create a document that helps corporations understand the role that health plays in the future of their business and compels them to act
- √ Help policy makers understand how they can engage industry to improve health impacts
- √ Identify game-changing business processes

In this group

- ❑ Janet Beauvais, McGill University
- ❑ Jorgen Schlundt, Technical University of Denmark
- ❑ Frederic Blaise, Enzyme Communication Marketings Inc.
- ❑ Chantal Blouin, Carleton University
- ❑ Hank Cardello, Hudson Institute
- ❑ Mark FeDuke, VLM Foods Inc.
- ❑ Catherine Gervais, INSPQ
- ❑ Jenilee Guebert, University of Toronto
- ❑ Pamela Laughland, University of Western Ontario
- ❑ Jordan LeBel, Concordia University
- ❑ Gaetan Lussier, CAPI
- ❑ Keith Mussar, CAIE
- ❑ Robert Pederson, EPHAC
- ❑ David Sparling, Richard Ivey School of Business

CREATING COLLABORATIVE ENGAGEMENT

To transition toward healthier and sustainable food systems

Enablers to achieve the intended outcomes:

- The trade security model of US custom is a model of creating incentives for business to engage in the process
- Good science, good communication of that science, it can make change happens
- A global body that comes to a consensus on what is a healthy food

Challenges and barriers in moving forward:

- Risks of conflict of interests vs. Business engagement; who would lead the process, governance to manage the risks of conflict of interest
- Need for clear rules of engagement: e.g., PAHO Partners Forum, confused role and mandate
- Fear of regulation in large agro-business vs. Focus on stock prices; how to do provide the right environment to allow business to engage in this discussion on healthier foods
- For politicians: the economic or security argument needs to be made for policy to be adopted
- Some leaders would not want to be at the table because of risks of credibility
- Consumers demand for healthier food, will not be sufficient, we need courage; we should not focus on the consumer making the choices, regulation (nutrition labelling) does it work?
- Difficulty of setting standards; why? A lot of vested interests

What is needed to achieve the intended outcome:

Deliverables to achieve the intended outcome:

- CODEX as a model for collaborative engagement for healthier food in global food system
- Public/Private partnerships in food and health and case studies in other sectors
- Engaging industry in health and solving obesity
- Creating Global Standards –evolves with science, technology and business processes.
- A list of principles on healthier food systems - *Still fuzzy*
- Contributing to the G8/G20 programs to inform and influence the decision makers
- Influencing the UN UNGAS NCD Summit

Relevant questions to achieving the outcome:

How can industry become proactive in helping society deal with societal health issues (e.g., obesity; the special issue of childhood obesity; salt)?

- Keep them simple
  - *Calories* – first cut - simple but an important factor in reducing obesity
  - For sodium – salt levels
- Establish hard targets with industry commitments to lower levels
- Higher level metrics may be worked out between industry and government

Can nutrition be included in the Codex scope (incl. WTO/SPS issue)?

- If yes, what would need to be changed in Codex – ("it can be done, but …" "it cannot be done because…"). In order to effectively do this, which issues have to be solved - What are the barriers to such action?
- What is the organization of stakeholders that would interact in Codex – is it well understood by food industry in all countries? The case for awareness raising for relevant stakeholder group? (the awareness of what Codex can do)
- What would be relevant alternatives to a Codex-like system:
  - Tri-lateral initiative (Cosmetics example)
  - SCN (UN Standing Committee on Nutrition)
  - Flour fortification case study (int fluor fortification initiative) – linkage to the inability to deal w this in Codex

Categorization/Principles for which standards to be done by industry, which standards to be done by government?

- Opportunity to link to health, sustainability and other outcomes

What is a mechanism of engagement of industry and civil society in setting broader standards?

How to deal with private standards?

- Areas to be led by governments – areas to be led by industry
- The case for bilateral/trilateral systems for standard setting

How do you incorporate continuous improvement in standard setting? How to keep standards up-to-date re new science, industrial innovation, societal needs in a dynamic environment?

- Driving change through revisable standards following change in measurable outcome or body of science – keeping pace with science, and innovation – regulatory regime – predictability

How to evaluate progress achieved by dynamic standards against an objective?

Roadmap (Milestones for the next 12 months)

The outcome would be achieved by completing the following milestones:

(1) The Business Metrics and Motivators

<u>Financial</u>

- Shareholder value market share, shareholder value, plus examples
- Cost reduction
- What practices have companies adopted and how has that affected their business

<u>The Business Metrics</u>

Brand – brand image and publicity – both positive and negative

- What does it cost to lose customers? What do you gain when new consumers come to your business because of health

- Changing consumer demand

The Business Metrics and Motivators

People

- What practices have companies adopted and how has that affected their business
- Influence on workforce – their health and also their willingness to stay with the company

The Business Motivators

Regulation

- Avoiding regulation or influencing the development of new regulation
- Creating effective industry self-regulation

The Motivators

Supply chain demands

- Changing customer requirements and supply chain requirements
- Supply chain partners – retailers are already moving into new systems

(2) Policy Options

- Regulation, taxes, and other punitive measures
- What re the more proactive and comprehensive policy options that can be both win/win
- Incentives to align industry – R&D, changing advertising deductions to favour healthier foods
- Must consider the metrics for business and the metrics for health

(3) Case studies

- Examples of case studies of health being good business
  - General Mills best practices – how have they changed the incentives and the impact
  - Appleby
  - Danone
  - Campbells

Cooperation rather than confrontation:

- Examples of cases where government and industry have worked together to develop policy together for win/win

Timing and Distribution:

- Business Case Metrics (18 months)
- Policy Initiatives (6 months in parallel)
- Best Practices Bible (6 months)
- Develop a tracking system (6 months in the main project)

GROUP

7

Objective

To develop a roadmap for a multi-countries diagnostic of beliefs and emotional systems, social norms and cultural values related to eating and to sketch a multi-media campaign for sustainable behavioral changes.

Intended Outcomes

- √ Roadmap for the creation of a multi-country diagnostic of factors related to eating
- √ Sketch of a multi-media campaign to help sustain behavioral changes
- √ Relevant applications for participatory model building for community and market transformation
- √ Research and action agenda

In this group

- ❑ Joanna Castellano, Q:Quest Inc.
- ❑ Robert Fisher, University of Alberta
- ❑ Doina Precup, McGill University
- ❑ Antoine Bechara, McGill University
- ❑ Hazhir Rahmandad, Virginia Polytechnic Inst. & State Univ.
- ❑ Jorgen Vitting Andersen, Institut non linéaire de Nice; Université Nice-Sophia Antipolis

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CROSS-CULTURAL DIAGNOSTIC AND MULTI-MEDIA STRATEGY FOR
Health-Promoting Beliefs and Emotional Systems, Social Norms and Cultural Values Related to Eating

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Description of the intended outcomes:

- Engagement of school aged children
- Engagement of other parts of population
- Generation and evaluation of interesting and potentially high-impact initiatives
- Cross-cultural exchange of ideas and dissemination of best practices

Enablers to achieve the intended outcomes:

- Primary: About 2 person months of work from a project leader to get interested organizations involved.
- Secondary: Once you get the interest of some funding agencies, we need to design the implementation plan and resources accordingly.

Challenges and barriers in moving forward:

- Getting to kids would be tough due to protection of children issues.
- Going through education system will also be a challenge.
- These need to be considered in the design of the implementation plan. We need to involved the key advocacy groups involved and on board.

What is needed to achieve the intended outcome:

- Find a lead person or a lead organization; we need a champion. This may need only 2 person months, if we are lucky.
- Collaborators need to be strategically chosen to cover key stakeholder groups

Deliverables to achieve the intended outcomes:

- A (set of) architecture(s) for implementing the crowd-sourcing initiative

Roadmap (Milestones for the next 12 months)

The outcome would be achieved by completing the following milestones:

- Find a champion to lead the initiative
- Find financial backing and organizational champions
- Define the parameters of architecture, evaluation, competition
- Recruit partners and start the hype

Distribution of Results:

That part of the architecture, but:

- Web-based dissemination
- Repository of ideas
- Community involvement and media
- Get advocacy groups involved

Proposed recommendations:

- Designing and implementing crow-sourcing healthier lifestyle initiatives targeting different "in need" sub-populations by releasing a stream of choice levers.
- Creating architecture for funding prizes for competitions among different groups of students/companies who may want to design initiatives for healthier lifestyles.

NEXT STEPS AND CLOSING REMARKS

Keynote Address

Muhammad YUNUS, Grameen Bank

CAN A SOCIAL WALL STREET BECOME A REALITY?

Weaving Nature and Nurture into Finance to Address
Health and Economic Challenges of the Poor

2006 Nobel Peace Prize Recipient
Muhammad Yunus

The closing dinner featured a keynote address by Dr. Muhammad Yunus, the 2006 Nobel Peace Prize Recipient, and Founding and Managing Director of Grameen Bank, and roundtable discussion on the theme "Can a Social Wall Street Become a Reality? Weaving Nature and Nurture into Finance to Address Health and Economic Challenges of the Poor". The dinner was meant to close the international roadmap development workshop as well as to inaugurate Dr. Muhammad Yunus' visit to McGill University.

High-Level Roundtable Discussion

Emmanuel FABER, Danone Limited
Alban D'AMOURS, International Confederation of Popular Banks
Didier SORNETTE, Swiss Federal Institute of Technology; Financial Crisis Observatory
Antoine BECHARA, McGill University
John M. COATES, University of Cambridge

> "The positive impact of the business on people or the environment rather than the amount of profit made measures the success of the social business"
>
> - MUHAMMAD YUNUS

In both developed and developing countries, social businesses have emerged to tackle problems in sectors such as healthcare, education, affordable housing, clean technology and microfinance. Now that there is a stable and growing base of existing and emerging social businesses, there is a need for sufficient financial capital to realize scale and/or their true potential for impact. Social Venture Capital firms are beginning to address this need by directly investing in businesses that are socially and environmentally responsible. But even those social businesses with access to some funding are seeing their capital needs quickly outpace the capacity of investors in the private markets. There is a need to bring social issues into financial markets and to move away from the short-termism which currently characterises the financial sphere. This situation is in part tied to an excessive reliance on self-interest and perfection rationality of humans, organizations and markets. Yet, cutting-edge research in behavioral finance, neuroeconomics and econophysics, as well as old and new community-supportive business and finance models, converge on suggesting that weaving nature and nurture into finance can help address health and economic challenges of the poor in a sustainable manner. Dr. Yunus suggests that there are three models of financial institutions that can be explored as avenues to finance social businesses: social-venture capital funds, social mutual funds, and a full-fledged social stock market. The high-level roundtable discussion generated a dialogue on how to build the foundations of a first social stock market in Canada. Discussions also demonstrated how better knowledge of human biology could help yield healthier finance systems.

APPENDIX A: PARTICIPANTS

Name	Title	Organisation
David F. Andersen	Distinguished Service Professor	State University of New York at Albany, USA
Denise Avard	Research Director	McGill University, Canada
Philip Awadalla	Professor; Co-Director	Université de Montréal; CARTaGENE, Canada
Alaa Badawi	Research Scientist	Public Health Agency of Canada
Janet Beauvais	Professor of Practice	McGill University, Canada
Antoine Bechara	CRC Chair, Professor	McGill University, Canada
Vikram Bhatt	Professor	McGill University, Canada
Frédéric Blaise	President, CEO	Enzyme Communication Marketing Inc., Canada
Rick Blickstead	CEO; Adjunct Professor	Wellesley Institute; University of Toronto, Canada
Chantal Blouin	Associate Director, CTPL	Carleton University, Canada
Catherine Boileau	Director	CARTaGENE, Canada
Ray D. Bollman	Chief	Statistics Canada
David Buckeridge	Assistant Professor	McGill University, Canada
Hank Cardello	Visiting Fellow	Hudson Institute, USA
Joanna Castellano	President	Q:Quest Inc, Canada
Michele Cecchini	Health Economist, Policy Analyst	OECD, France
Debesh Chakraborty	Professor	Jadavpur University, India
Martin Cloutier	Professor	Université du Québec à Montréal, Canada
John M. Coates	Senior Research Fellow	University of Cambridge, UK
Rémi Coderre	Director of Evaluation	Québec En Forme, Canada
Christopher Comeau	Senior Consultant, Facilitator	Collaborative Transformation™, Canada
Manon Cormier	Director of Health Affairs	Danone Inc., Canada
Alain Dagher	Associate Professor	McGill University, Canada
Alban D'Amours	President; Former President, CEO	International Confederation of Popular Banks, Belgium; Desjardins Group, Canada
Sylvie Desjardins	Scientific Director, Senior Health Economist	Public Health Agency of Canada
Marie DesMeules	Director	Public Health Agency of Canada
Sanjay Dhar	James H. Lorie Professor of Marketing	University of Chicago Booth School of Business, USA
Timothy E. Dolson	Vice-President of Research	The Nielsen Company, USA
Julie Dostaler	Secretary General	Québec en Forme, Canada
Jean-Pierre Dubé	Sigmund E. Edelstone Professor	University of Chicago Booth School of Business, USA
Laurette Dubé	Founding Chair, Scientific Director	McGill World Platform for Health and Economic Convergence, Canada
Ahmed El-Sohemy	Associate Professor	University of Toronto, Canada
Alan Evans	Director	McGill University, Canada
Emmanuel Faber	Deputy Director General	Danone Limited, France

Name	Title	Organisation
Matthias Faeth	Researcher	McGill University, Canada
Samer A. Faraj	Canada Research Chair	McGill University, Canada
Mark FeDuke	Director	VLM Foods Inc., Canada
Lesley Fellows	Associate Professor	McGill University, Canada
Philippe Finès	Analyst	Statistics Canada
Robert Fisher	Professor	University of Alberta, Canada
Isabel Fortier	Director	P^3G Observatory, Canada
Avi Friedman	Professor	McGill University, Canada
Catherine Gervais	Scientific Advisor	Institut national de santé publique du Québec, Canada
Ratna Ghosh	W. C. Macdonald Professor	McGill University, Canada
Richard Gold	Associate Professor	McGill University, Canada
Reut Gruber	Researcher; Assistant Professor	Douglas Hospital; McGill University, Canada
Jenilee Guebert	Director of Research	University of Toronto, Canada
Peter Haas	Research Staff Member	IBM Almaden Research Center, USA
Ross Hammond	Director, Senior Fellow	The Brookings Institution, USA
Philip James	President	International Assoc. for the Study of Obesity, UK
Jan Jorgensen	Associate Provost	McGill University, Canada
David L. Katz	Associate Professor; Director, Co-Founder	Yale University; Integrative Medicine Center, USA
Dora Koop	Director of Business Solutions	McGill University, Canada
Johanne Laguë	Medical Specialist; Manager	Institut national de santé publique du Québec, Canada
Lucie Lapierre	Head of Innovation	Québec en Form, Canada
Pamela Laughland	Research Associate	University of Western Ontario, Canada
Jordan LeBel	Associate Professor	Concordia University, Canada
Jean-Frederic Lemay	Researcher	Équiterre, Canada
Robert Levitan	Professor	University of Toronto, Canada
Deborah L. Andersen	Assistant Professor	State University of New York at Albany, USA
Gaétan Lussier	Founding Chairman	Canadian Agri-Food Policy Institute
Yu Ma	Assistant Professor; Visiting Scholar	University of Alberta; McGill World Platform for Health and Economic Convergence, Canada
Ann C. Macaulay	Professor, Director of Participatory Research	McGill University, Canada
Tony Marino	Vice-President	The Nielson Company, Canada
Jaykumar Menon	Award-winning International Human Rights Lawyer; Senior Director	Center for Constitutional Rights; X-Prize Foundation, USA
Lyne Mongeau	Coordinator	Ministère de la santé et des services sociaux du Québec, Canada
Kakali Mukhopadhyay	Research Associate	McGill University, Canada
Keith Mussar	Chair of Food Committee	Canadian Association of Importers and Exporters
Eric Myles	Executive Director	Québec en Forme, Canada

Name	Title	Organisation
Philip Oxhorn	Director, Associate Professor	McGill University, Canada
Vural Ozdemir	Associate Professor	McGill University, Canada
Martine Pageau	Nutritionist	Ministère de la Santé et des Services sociaux, Canada
Robert Pederson	Manager	European Public Health and Agriculture Consortium, Belgium
Doina Precup	Associate Professor	McGill University, Canada
Eric Robitaille	Scientific Advisor	Institut national de santé publique du Québec, Canada
Brenda Roche	Director of Research	Wellesley Institute, USA
Nancy Ross	Associate Professor	McGill University, Canada
William Ross	Director	Health Canada, Canada
Hazhir Rahmandad	Assistant Professor	Virginia Polytechnic Institute & State University, USA
Derek Ruths	Assistant Professor	McGill University, Canada
Harry Rutter	Director, Honorary Senior Clinical Lecturer	National Obesity Observatory; University of Oxford, UK
Jonathan Salsberg	Associate Director, Research Manager	McGill University, Canada
Mark Sarner	President	Manifest Communications, Canada
Jørgen Schlundt	Deputy Director General	Technical University of Denmark
Arash Shaban Nejad	Post Doctoral Fellow	McGill University, Canada
Prakash Shetty	Professor	University of Southampton Medical School, UK
Thomas Shultz	Professor	McGill University, Canada
Richard Smith	Head of Health Policy Unit	London School of Hygiene, UK
Didier Sornette	Professor, Chair of Entrepreneurial Risks	ETH Zurich, Switzerland
David Sparling	Chair	Richard Ivey School of Business, Canada
Jeroen Struben	Assistant Professor	McGill University, Canada
Terry-Nan Tannenbaum	Deputy Director	Montreal Health and Social Services Agency, Canada
Paul Thomassin	Associate Professor	McGill University, Canada
Omar Toulan	Associate Professor	McGill University, Canada
Jørgen Vitting Andersen	Senior Researcher; Co-Director	Institut non linéaire de Nice; Université Nice-Sophia Antipolis
Ljubica Vuckovic	Senior Economist	Agri-Food Chain and IRM Analysis
Karen Watson	Managing Director	The Nielsen Company, USA
Patrick Webb	Dean of Academic Affairs, Professor	Tufts University, USA
Rickey Yada	Scientific Director	AFMNet, Canada
Muhammad Yunus	2006 Nobel Peace Prize Recipient; Founder & Managing Director	Grameen Bank, Bangladesh

APPENDIX B: WORKSHOP AGENDA

THE BRAIN-TO-SOCIETY (BTS) ROADMAP:
To Lead, Manage, and Govern Complexity for a 21st Century Aligned with the Limitsand Power of Human Biology – Overview and Plans for Proof of Concept with Healthy Eating (Canada, USA, UK, India and Global)

DAY 1 – Wednesday, September 29, 2010 from 7:30 to 19:30

8:00 – 8:10 **Opening Remarks -** *Laurette Dubé*, McGill World Platform for Health and Economic Convergence

8:10 – 8:30 **Opening Keynote Address**
Diversity, Innovation and Collaboration in Complex Social and Economic Systems: Common and Distinct Challenges and Possibilities between Healthy Finance and Healthy Eating
Didier Sornette, Swiss Federal Institute of Technology; Financial Crisis Observatory

MORNING SESSION: Key Knowledge Gaps for Scaling Up and Sustaining Changes on the Ground for Healthy Eating

Facets of Healthy Eating: (-) Safe, Nutritious, Palatable and Affordable Food; (-) Nutritiously Balanced and Sustainable Diet for All

Moderator - Christopher Comeau, Collaborative Transformation™

8:30 – 9:00 **Prevention of Obesity and Chronic Diseases**
Eric Myles, Québec en Forme
Harry Rutter, University of Oxford

9:00 – 9:15 **Plenary Discussion**

9:15 – 9:45 **Food Chain Sustainability**: The Role of the Agriculture, Food and Health Systems in Addressing Healthy Eating in All its Dimensions of Food Insecurity, the Growing Burden of Over- and Under- Nutrition and Food Safety
Patrick Webb, Tufts University
Jørgen Schlundt, National Food Institute, Technical University of Denmark

9:45 – 10:00 **Plenary Discussion**

10:00 – 10:15 **BREAK**

MORNING SESSION: The BtS Diagnostic - A Science of the *How* to Scale Up Changes on the Ground

10:15 – 10:35 **Keynote Presentation** - *Timothy E. Dolson*, The Nielsen Company

10:35 – 11:45 **The BtS Diagnostic – Societal: Bridging Metrics for Better Health and Economic Outcomes**
William Ross, Health Canada
Michele Cecchini, Organization for Economic Co-operation and Development
Philip Awadalla, Université de Montréal; CARTaGENE
Isabel Fortier, P^{3}G Observatory

11:45 – 12:00 **Plenary Discussion**

12:00 – 12:50 **LUNCH**

AFTERNOON SESSION: The BtS Diagnostic - A Science of the *How* to Scale Up Changes on the Ground

12:50 – 13:35 **The BtS Diagnostic – Societal: Bridging Disciplinary Modeling**
Nancy Ross, McGill University
Prakash Shetty, University of Southampton Medical School & *Josef Schmidhuber,* Food and Agriculture Organization
Jean-Pierre Dubé, University of Chicago Booth School of Business

13:35 – 13:50 **Plenary Discussion**

13:50 – 14:50 **The BtS Diagnostic - Individual**
Robert Levitan , University of Toronto
Alain Dagher, McGill University
Ahmed El-Sohemy, University of Toronto
David L. Katz, Yale University; Integrative Medicine Center

14:50 – 15:05 **Plenary Discussion**

15:05 – 15:20 **BREAK**

15:20 – 16:20 **The BtS Diagnostic: Computational Systems Sciences**
Ross Hammond, The Brookings Institution
David F. Andersen, State University of New York at Albany
Richard Smith, London School of Hygiene
Peter Haas, IBM Almaden Research Center

16:20 – 16:35 **Plenary Discussion**

AFTERNOON SESSION: Collaborative Stakeholder Engagement

16:35 – 16:55 **Keynote Presentation** - *Hank Cardello,* Hudson Institute
Placing Health on the Strategic Innovation and Collaboration Agenda of Business at National and Global Level

16:55 – 17:55 **Collaborative Stakeholder Engagement**
Joanna Castellano, Q:Quest Inc
Mark Sarner, Manifest Communications
Robert Pederson, European Public Health and Agriculture Consortium
Richard Gold, McGill University

17:55 – 18:10 **Plenary Discussion**

18:10 – 18:30 **Concluding Keynote Presentation** - *Alban D'Amours*, International Confederation of Popular Banks
Old and New Business Models to Weave Health and Social Issues into Business and Finance

18:30 – 19:30 **MWP COCKTAIL - Celebration of the Newly Released MWP Books:**
"Obesity Prevention: The Role of Brain and Society in Individual Behavior" (Elsevier)
"Food, Trade, Health and Globalization" (Routledge)

Keynote Presentation - *Philip James*, International Association for the Study of Obesity

Commentary - *Chantal Blouin,* Carleton University

19:30 **END OF DAY 1**

DAY 2 – Thursday, September 30, 2010 from 8:00 to 21:30

Moderator - Christopher Comeau, Collaborative Transformation™

BTS DIAGNOSTIC:

1. Bridging Metrics between Agriculture, Manufacturing, Retail, Media and Consumption with Nutritional Information for Better Health and Economic Outcome
2. Concept and Method Development for Environment Responsiveness Endophenotype with Individual-Level Agent-Based Model

COMPLEX COLLABORATION AND INNOVATION:

3. Participatory Systems Dynamics Modeling of Agriculture and Food Market Transformation for Designing, Implementing and Monitoring Local, National and Global Policy to Prevent Obesity and Chronic Diseases
4. Participatory Systems Dynamics Modeling of Community Transformation for Designing, Implementing and Monitoring Local, National and Global Policy to Prevent Obesity and Chronic Diseases
5. Bridges between Agriculture, Social, Health, and Technological Innovation to Speed Up and Scale Up Response to Food and Nutrition Insecurity
6. Multi-Faceted Integration of Norms, Standards, Practices and Rules for Healthy Eating along Local, National and Global Agriculture, Food and Health Value Chains (with seed discussion for social network modeling)
7. Cross-Cultural Diagnostic and Multi-Media Strategy for Health-Promoting Beliefs and Emotional Systems, Social Norms and Cultural Values Related to Eating (with seed discussion for agent-based and systems dynamics modeling)

8:30 – 9:30 **Opening and Setting the Context**

Developing Roadmaps as Part of the BtS Diagnostic Project

9:30 – 10:30 **Clarifying the Intended Outcomes and Deliverables**

10:30 – 12:30 **Exploration of the Opportunities**

12:30 – 13:30 **LUNCH**

13:30 – 15:30 **Approach to Achieve the Outcomes**

15:30 – 17:00 **Consolidation of Roadmap's Initiative, Next Steps and Timelines from Each Action Group**

17:00 – 17:30 **Final Summation**

18:30 – 19:00 **COCKTAIL**

19:00 – 21:30 **CLOSING DINNER**

Words of Welcome - *Laurette Dubé*, MWP

Keynote Address - *Muhammad Yunus,* Grameen Bank
Can a Social Wall Street Become a Reality? Weaving Nature and Nurture into Finance to Address Health and Economic Challenges of the Poor

Roundtable Discussion
Emmanuel Faber, Danone Limited
Alban D'Amours, International Confederation of Popular Banks
Didier Sornette, Swiss Federal Institute of Technology; Financial Crisis Observatory
Antoine Bechara, McGill University
John M. Coates, University of Cambridge

21:30 **END OF DAY 2**