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PUBLIC OPINION RESEARCH INTO BIOTECHNOLOGY ISSUES

FOURTH WAVE

**Presented to the Biotechnology Assistant Deputy Minister
Coordinating Committee (BACC), Government of Canada**

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Prepared for the Biotechnology Assistant Deputy Minister Coordinating Committee, Government of Canada, by Pollara Research and Earncliffe Research and Communications.

The opinions and statements in this publication do not necessarily reflect the policy of the Government of Canada.

DRAFT

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Introduction

Earnscliffe Research and Communications is pleased to present this report on a public opinion research program conducted in the winter of 2001 for the Assistant Deputy Minister Coordinating Committee (BACC). This was the fourth wave of a series that began in the fall of 1999. This wave was comprised of two separate instruments:

- a telephone survey of 1200 Canadians;
- eight focus groups designed to support the survey.

The research investigated a number of key tracking issues related to stewardship and benefits. In addition, this wave of research placed significant focus on communications issues – messages and themes both in relation to the technology and in relation to government's role in this field.

The research was designed to accomplish two major objectives:

- to track sentiment on a range of biotechnology issues, using a baseline of data developed in previous waves of research; and
- to assess communications messages and information in aid of developing communications strategies.

The research probed a number of areas of investigation in order to develop a comprehensive analysis of current opinion on biotechnology. The areas included:

- overall awareness and familiarity;
- perceived risks, benefits and drawbacks;
- assessments of government performance in biotechnology, and preferred roles and future priorities for government;
- the testing of communications materials and information.

The telephone work began on March 15, 2001, and ended on March 24, 2001. The survey reports on the views of a random sample of 1200 Canadians and carries a margin of error for the national sample of +/- 2.8%, nineteen times out of twenty.

Four nights of focus groups (eight groups in all) were conducted in Montreal, Toronto, Vancouver and Halifax between March 26 and March 29, 2001.

The research followed a set agenda for discussion and was designed to probe in more detail opinion underlying the results of the telephone survey. Each night involved a group of approximately ten participants drawn from the general population and a group of similar size comprised of *Involved Canadians*, our proprietary population segmentation of Canadians who are significantly more interested and involved in public policy issues.

Further information can be obtained from Pollara or Earnscliffe Research and Communications. Please contact either of the following at our offices, (613) 233-8080, or via e-mail:

Elly Alboim (elly@earnscliffe.ca)
Jeff Walker (jwalker@earnscliffe.ca)
Don Guy (dguy@pollara.ca)

EXECUTIVE SUMMARY

Awareness, Familiarity and Interest

Biotechnology is a subject that has become a firmer part of the Canadian public consciousness over the past two years. A majority of Canadians report hearing and talking about biotechnology in recent months, although the growth in the number doing so has leveled off following significant increases over the past two waves of research.

In spite of these growing levels of awareness, there remain relatively low reported levels of familiarity with and interest in the issue. That being said, in focus groups, Canadians, particularly Involved Canadians, suggest that they have noticed increasing volumes of media coverage. Those who are interested in this subject show deeper knowledge in discussion than they have in previous waves of research.

Consistent with previous research, most people associate biotechnology with health and medical benefits, or with GM food. There remains minimal awareness of forestry or environmental applications like biomass energy. There is also virtually no awareness of the size and importance of the biotechnology industry in Canada. Most people are surprised to hear about some of the research breakthroughs with which Canadian biotech scientists have been involved.

Top-of-Mind Disposition – Support and Opposition

Slightly fewer than two out of three Canadians express support for biotechnology, a level equal to that found in the previous wave of research in September 2000. The survey data reveals that the vast majority of both supporters and opposers of the technology express their sentiments with little intensity – few report strong support or strong opposition. Our experience suggests that while, in part, this is a product of a lack of interest in these technologies (usually among the general public), among those with higher levels of awareness (usually Involved Canadians) it is often a product of internal conflicts about the benefits and risks that these technologies bring, and an attendant unwillingness to offer a blanket acceptance or rejection of the technology. Segments of the population that tend to be more supportive of biotechnology include men, as well as those with higher levels of income and education. Segments that tend to be less supportive include older Canadians, those with lower levels of education and income, and

women. Our research indicates that women tend to express more concern about risk than men, which affects their willingness to accept many applications.

This wave of research confirms the assessment made following last September's research that as Canadians become more aware of biotechnology, they are less willing to make blanket assessments (either positive or negative) about it. With higher levels of awareness, views become more nuanced, and often come with qualifications, reflecting consideration of the numerous benefits and risks that surround biotechnology and its applications. In focus group discussions, it usually becomes clearly evident that most people are torn in their views toward biotechnology, as they seek to reap the potential benefits but remain wary of the potential risks.

Biotechnology Applications

The vast majority of Canadians resist offering systemic views on biotechnology applications. Most people evaluate each application on its individual merits, employing a core analytical framework to assess applications on a case-by-case basis. That framework involves an implicit risk/benefit calculation, with the net conclusion depending on the assessment of the marginal personal benefit conveyed by the application. In simple terms, the larger and more personal the anticipated benefit, the more acceptable the risk and the higher the level of support for a given application. The more intrusive the application, the higher the life form it involves and the larger the degree to which the application crosses boundaries separating plants, animals and humans, the larger the perceived risk. Human gene modification is the most problematic concept for most people and requires the largest set of expressed benefits to render it acceptable. Central to understanding the risk/benefit analysis of applications that most people carry out is that the *purpose* of the application is a key positive driver, and the *process* of creating the application is a key negative driver.

As has been found in all previous waves of biotechnology research, health and medical applications are the most positively received, and GM foods are the least. Environmental applications remain virtually unknown. Upon discussion, it is clear that people are receptive to the benefits case for environmental applications, particularly in areas like bio-remediation, but there is some concern about the risks of environmental biotechnology agents ending up in the water supply or food chain. The results suggest the need for comprehensive research into ecosystem impacts of these applications. Our assessment is that extensive scientific research will be a quid pro quo for public acceptability of applications in the environmental field.

Two new biotech applications were tested in focus groups during this wave of research. The first was the stimulation of insulin production to treat sufferers of Type 1 Diabetes, through the introduction of modified genes into the pancreas. This application was widely deemed acceptable because of the substantial benefit that this technology promised to those who suffer from the disease. The second, which involves the growth and use of biomass energy products, was generally found to be appealing, although those who tend to be most concerned about biotechnology often raised questions about the risks to the surrounding ecosystems.

Risk

As we have suggested in previous waves of research, assessments of risk and in particular risk/benefit ratios are central to understanding public attitudes toward biotechnology. Among the most notable findings garnered in previous waves of research is a strong correlation between the uncertainty people carry about biotechnology and its long-term risk and their demand for government stewardship. Because of its importance, each research wave has probed the risk issue to ensure the phenomenon is thoroughly understood. In general, the results have been quite consistent.

- The more significant the benefit (health/medicine being the most powerful), the more acceptable the risk.
- In virtually every formulation, there is a quite small percentage of people who *strongly* disagree (the best indicator of settled negative opinion) with proceeding to reap the benefits of biotech despite the risks.

This survey tracked a number of issues involving risk. Much of this work involved investigating various risk/benefit equations. The findings suggest that there has been some movement toward the center, with people expressing more equivocal views toward the issues, and in particular greater consideration of issues relating to risk. That being said, the net risk/benefit equation for most people remains positive – while fewer express extreme views, the overall proportions in agreement with the risk/benefit propositions in the survey remain similar to results found in previous waves of research.

The most prevalent negative driver in the realm of biotechnology is rooted in concern about long-term risks and unknowable outcomes that these technologies may produce. In particular, potential long-term risks to human health and the environment are what concern Canadians most. Absent consideration of

benefits, the presentation of these risks drives many people to resist the technology.

At the same time, people recognize that there are important benefits to be accrued from these technologies and that some level of risk has to be taken in order to gain them. This research illustrates this finding in two ways. First, when risk statements are posed to respondents, accompanied by mention of the potential benefits (especially health benefits), a majority are drawn to agree that the benefits outweigh the risks. Second, people resist the idea that because of the potential risks, these technologies should be stopped altogether or governments should completely ban their use. It appears that these technologies are closely linked to people's conceptions about human progress, and the benefits that progress brings. The idea of banning a technology altogether strikes many as an unreasonably radical measure.

In reality, most Canadians express a sense of inevitability about biotechnology, coupled with a strong sense that risk is pervasive in modern society and that managing risk in biotech, as in other fields, is about as much as can be expected. Ultimately, the risk most are willing to accept is best characterized as calculated risk, that is, taken with the view of realizing a substantial benefit and with a keen eye on managing the potential downsides. Our assessment is that some degree of risk is acceptable to Canadians, but only in the contexts of substantial benefit and diligent government stewardship.

The case for biotechnology applications is most widely compelling to Canadians when it is built on science. This finding has been noted consistently in both surveys and focus groups since Earncliffe and Pollara have been conducting research for the Government of Canada. The wide majority tends to be reluctant to accept arguments based on fear or emotion. Ultimately, if an application is deemed safe by the "best available" scientific research, and is monitored over time through diligent government surveillance and ongoing research, the test for acceptability has been met.

Federal Government Performance, Priorities and Roles

Survey results suggest that the public assessment of the federal government's performance in biotechnology remains weak. Focus group discussions indicate that there are four drivers of these assessments. First, performance is linked to a general malaise with government, evidenced in data collected by Earncliffe/Pollara and others over the past decade. Second, there is virtually no understanding or knowledge of the government's biotechnology policy or

regulations, leading many to assume that little is being done. Another key factor has to do with perceptions about how well government studies risks, particularly long-term risks, and how well it is able to keep up with innovations in products as well as methods of testing and evaluation. Finally, some express concern that government cutbacks have eroded the effectiveness of the regulatory system.

In most focus groups (even among Involved Canadians) only after prompting did some suggest that the government probably has rules governing what kinds of safety tests products must meet, but none knew at any level of detail what those rules consisted of.

However, when asked about whether they feel safe about health and/or food products and the respective product approval processes, attitudes were much different – people were much more positive. Indeed, the vast majority suggested that they feel confident in Canadian product safety approval processes. In particular, a majority feel that food on grocery store shelves is safe, with the exception of the “core” opposers of biotech and GM food (about 10-15% of the population) who express significant concern about whether food on shelves is safe.

For those who expressed skepticism, a very consistent view emerged on what would improve their confidence: the integration of independent verification of research by scientists outside government (at universities, possibly from other countries), contracted by government to provide a secondary “check” on research.

When asked how Canada’s regulatory system compares to systems in other countries, most believe that Canada’s regulatory and safety system, particularly in the area of health, is probably the same or better than that of other industrialized nations. Most often, these views are based not on any knowledge about what the standards and practices are regarding biotechnology, but on positive associations people have with Health Canada on other issues. Of note, many cite the drug approval process as a reference point for their assessments of biotechnology products, and assert that those processes are quite stringent, leading them to suggest that biotech approval processes probably are as well.

In terms of government priorities, while a majority suggest that government is currently pursuing an equal balance between promotion and stewardship of biotechnology, respondents expressed fairly clear views about what the government roles *should* be. Most believe that the government should place greater emphasis on stewardship, and must regulate aggressively to ensure

product safety, with a strong focus on research into long-term health and environmental impacts.

There is continuing broad support for a two-track policy approach which includes a strong regulatory and scientific oversight system for long-term surveillance and research, in concert with measures designed to foster the development of the technology and the industry. People don't see stewardship and promotion as a "zero-sum" game – both can and should be pursued, but primacy is assigned to the stewardship function because the technology is seen to so materially affect people's lives.

Moreover, a fairly universal consensus has emerged that GM products are different than other products and should be subject to higher standards and more comprehensive research and testing. Finally, Canadians also believe the federal government should make it a priority to collaborate with other countries on biotechnology, particularly in the areas of safety and regulation.

Economic support to industry was deemed important, but less important than safety regulations and research into long-term health and environmental impacts. Nevertheless, Canadians very much want government to ensure they reap the benefits of what they see as truly important scientific breakthroughs, particularly in health and medicine. They also want to ensure that Canada is at the forefront of scientific research internationally because of the economic benefits it can bring, and because it can help to address perceptions of a "brain drain" of bright young Canadians to other countries.

The Innovation Agenda and Government's Support Role

In this wave of research, Earnscliffe/Pollara investigated in some detail government's support role to the sector, and in particular the relationship between its Innovation Agenda and biotech.

Only a handful of respondents initially had a sense that the government plays a role in facilitating the development of industries like biotech and being involved in an "innovation agenda." In general, those who indicate some unprompted awareness of this tend to be those most concerned about it, worried that government might be, and might become further beholden to, corporate interests. Upon discussion, others were more supportive of the role in general, and a clear majority accepted that a government-driven innovation agenda can reap benefits for Canadians. People tended to believe that government support would hasten the maturing of the industry.

After discussion (and prompted by the rationale outlined in the moderator's guide, which attempted to draw a parallel between support to the information technology industry and biotech), more were convinced that an innovation agenda should be a government priority.

Aspects of the Innovation Agenda that tend to drive higher levels of acceptance of the importance of this role for government (in descending order of importance) included:

- The ability to link Innovation Agenda resources with university labs and researchers
- The ability to develop new research techniques to evaluate the safety and effectiveness of biotech products (through universities as well as government)
- Concerns about a "brain drain" of young people to the United States
- The idea that government support might facilitate access to products faster
- The importance of high technology as a creator of value-added jobs – especially among Involved Canadians, but less so among the general public, who express concern that those jobs will leave them behind

Decision Making

The vast majority of Canadians continue to believe strongly that science should be the primary guide to decision making about biotechnology applications. While many people do see biotechnology as having moral or ethical dimensions that have to be considered (particularly in the area of human applications), health and environmental impacts are the key drivers of concern about most applications.

This wave of research indicates a growing sense among Canadians that experts must be chiefly involved in assessing the merits of biotechnology products. Many, particularly those in the Involved Canadians segment, suggested that it must be experts, rather than the general public, that ultimately make decisions about these products. One proposition that was raised in several groups (and that gained widespread acceptance) is the idea of involvement of experts from both inside and outside government (ideally at universities), both to ensure that the most rigorous modern processes are being used to evaluate the products, and to provide a check against corporate influence over the evaluation process.

GM Food

In spite of continued high awareness of GM food, the GM food debate still has not catalyzed opinion negatively in Canada. The vast majority of survey and focus group participants believe that food on grocery shelves is safe and has been tested by government. While some indicate concern about these foods when asked, this concern is often driven as much by questions about why people haven't been offered a choice about purchasing these foods, as it is by questions about whether the foods themselves should be on the shelves.

This remains the case in spite of increasing awareness that a wide variety of processed foods contain GM ingredients.

There continues to be a widespread assumption that the long-term risk of GM food ingredients cannot possibly be understood yet. Few people are willing to say categorically that they will not consume food with GM ingredients. In part, that is because despite the long-term uncertainty, few believe there are current safety concerns -- they haven't heard anything about sickness or other negative consequences.

GM Food Labeling

After discussion of GM food and food safety issues, the focus groups investigated options for GM food labeling. Participants were asked for initial reactions to the idea of labeling, and then in turn, respondents were provided with a brief overview of some of the considerations involved in creating a national labeling system for GM food. Following that, they were provided with the most likely labeling options and asked to discuss the pros and cons of each.

At first blush, almost to a person, people strongly advocated an "informed choice" approach to GM foods, which necessitates some form of labeling. As long as the science is sound, most people feel that the purchase of GM food should be up to each individual. Most people initially regarded labeling as a simple issue that required little consideration because freedom of choice was the overriding principle. Most were quite perplexed to find that there are a number of potentially difficult policy issues involved.

After discussion of some of the considerations involved in labeling, among those least concerned or indifferent about GM foods, the extra cost or other potentially difficult consequences of labeling were sufficient to make them neutral on the issue. However, for everyone else, segregating food at the farm level, and the

costs that might impose on the system, were dismissed, especially by Involved Canadians. Some suggested that that this was "the cost of doing business" in biotech food. Similarly, the argument that labeling might frighten people from buying did not resonate; it was seen to imply a paternalistic distrust of Canadians' good judgement.

The one issue that tended to garner the highest level of consideration by respondents involved how a labeling system would affect Canada's trading relationships in food – in particular their access to imported food products if those products were not allowed in Canada (because they wouldn't be labeled.)

Ultimately, after discussion of these considerations, most people remained fairly steadfast in their belief that a GM food labeling system was required in Canada.

Respondents were then taken through a number of possibilities for the labels themselves. Again, it was quite clear that most people had never given the issue any thought at all and were surprised that there could be so much complexity in something that appeared at first to be quite simple. After discussion, the results were consistent across groups, with the following results:

- Labeling the process. The issue once again reduces itself to the question of risk. Most people believe most previous forms of genetic modification have proven themselves to be safe. So participants overwhelmingly chose a narrowly defined option – labeling products whose ingredients have been modified only by the latest and most intrusive forms of genetic engineering.
- Trace ingredients. Most participants believed that allowing a trace of GM ingredients was more practical than insisting on 100% purity – as long as the threshold was low and commonly accepted.
- GM or GM free. Perhaps surprisingly, this was the one area where there was virtually even split opinion. In major part that was because few (other than determined opponents of GM foods) could see much practical difference to them as consumers. They seemed to equate the issue with labels that currently say: "may contain peanuts" -- they said no one with an allergy would take the chance of eating these kinds of products but that it was largely an irrelevancy to most others. And in that analogy, "does not contain peanuts" would serve the same purpose, they said. In fact, they thought "may contain" might be slightly more helpful as an affirmative statement to those with concerns.

Communications Issues

This wave of research focused significant attention on communications issues associated with biotechnology. Three areas of communications testing were carried out – argumentation, both positive and negative, toward biotechnology in general; messages about government actions and priorities; and the associations people have with some overarching “brand” labels for the technology.

Three overarching “brand” words and phrases – biotechnology, life sciences and genomics – were tested.

- “Genomics” was not a phrase that is widely known, and among those that have some sense of the word and its connection to biotech, conceptual understandings tend to revolve around more invasive human applications and some of the negative aspects of the technology.
- While in the survey the phrase “life sciences” evoked positive sentiment, focus group research provided further insight. While it certainly received positive reaction, it did not connect at all with the field of biotechnology. It is a phrase that people see very broadly associated with science in general rather than biotech in particular. When asked whether it described biotechnology, many suggested that it did not, and some suggested that it might be used as a word to “spin” the public into making the field more acceptable.
- An increasing majority of Canadians have a positive connotation of “biotechnology.” Moreover, it was very clear in the focus groups that biotechnology was the most appropriate word to associate with these technologies, both because it carries the appropriate meaning and because it does not possess negative connotations for most people.

The main findings in the area of argumentation about biotechnology are as follows.

Positive arguments that involve health benefits and unlocking “the mysteries of life” were the strongest tested in this wave of research. Canadians clearly see these ideas as the most important, and most compelling benefits of the technology. Arguments involving discussion of environmental product benefits are also quite strong, although much less strong than the “mysteries of life” benefits. Arguments that discuss economic benefits alone tend to be less resonant. Of note, arguments that illustrate some of the potential downsides of

not embracing these technologies were met with similar levels of lukewarm interest, with one notable exception – preventing the brain drain. Preventing the brain drain was found to be an issue of significant concern to many Canadians and a driver of support for biotechnology research in Canada.

On the negative side, several arguments resonate with moderate levels of strength. Of note, the idea of a scientist's mistake causing a serious problem touched a nerve among a significant number. Argumentation about upsetting the ecosystem balance is also resonant, especially the ability of certain pests to grow more resilient as a result of pest resistance modified into crops.

However, both survey and focus group findings indicate that the positive arguments surrounding the mysteries of life and resulting health and environmental benefits of these discoveries remain stronger than the negative arguments. These kinds of arguments tap into people's underlying sense that biotechnology may provide society with incredible medical breakthroughs.

In terms of potential government communications, information that made reference to stewardship was most interesting to respondents. Among those individuals generally predisposed to support biotechnology, the stewardship messages tended to reassure them that government was executing its role appropriately. Those who tend to hold mixed views and those who tend to oppose these technologies found many of the stewardship-related messages less appealing, sometimes because the words were not appropriate but more often because they needed to hear more detail in order to feel more comfortably about the government role. In general, people were interested in hearing more detail about the kinds of efforts being made to ensure that stewardship was being carried out appropriately, including the scientific research studies themselves. The expression of information or assurances of safety without reference to more detailed facts and figures are not likely to positively influence the views of those with mixed or negative views toward the technology.

Communications that focused on the government role in harnessing economic benefits tended not to resonate as strongly among survey or focus group respondents. While this should not suggest that these kinds of messages will have negative impact, they simply are not as important to the respondents as the messages relating to stewardship.

Information about government programs to monitor long-term effects on human health and the environment of biotechnology applications was widely appealing to respondents. The idea of a "surveillance system" in particular was something that was attractive and appealing to many. However, the idea that Canada is "working

toward” these objectives often raised significant questions about how capable government is at keeping up with the evolution of these technologies.

The current government approach to biotechnology continues to be accepted by a wide majority of Canadians. Almost nine in ten agree that “the primary role of government in this field is to gain the benefits while managing the risks,” suggesting that gaining the benefits is an acceptable and appropriate objective to strive for, as long as stewardship is diligently pursued.

Conclusion

This wave of research marks another key point in the evolution of opinion trends associated with biotechnology and provides insights into several emerging issues. Although there remain low levels of familiarity and interest among the general population, the deepening of awareness, coupled with extensive media coverage, has had an impact in the depth of knowledge that interested people, particularly Involved Canadians, have with these technologies. This growth in knowledge has moderated views, evidenced by a movement away from extreme positions and toward the centre of the opinion spectrum. However, it has not catalyzed opinion either for or against the technology. While assessments are made on a case-by-case basis, overall, twice as many Canadians support the development of these technologies as oppose them. In the absence of awareness of clear benefits, opposition increases but awareness of benefits and risk provisions increases support. Scientific evidence is a key driver of attitudes, as is the principle of informed choice. While very few are willing to ban most of these products because they believe in individual choice, people believe they have a right to know the contents of the products they purchase and consume.

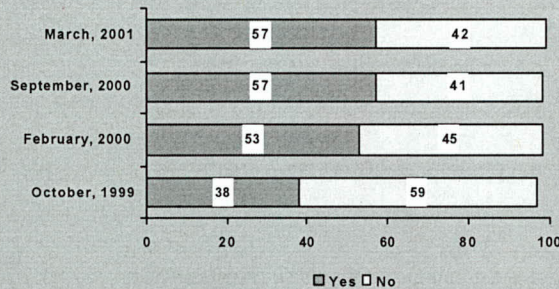
QUANTITATIVE FINDINGS

Awareness, Familiarity and Interest

A majority of Canadians report hearing and talking about biotechnology in recent months, although the growth in reported notice of these issues has leveled off following significant increases in the previous two years. Also consistent with last fall's research, there remain low reported levels of familiarity with the issue.

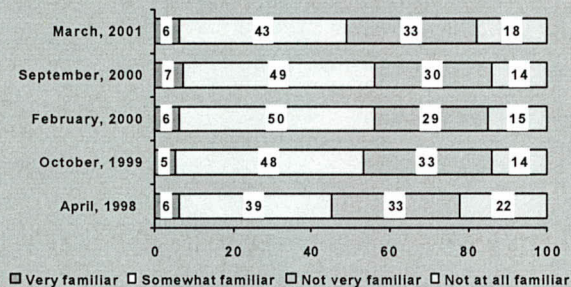
Recently Heard About Biotech

Over the past three months, have you heard anything about stories or issues involving biotechnology?

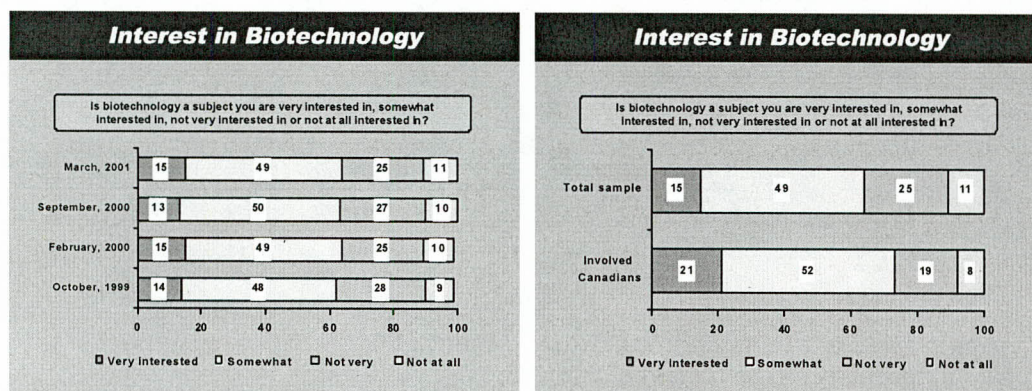


Familiarity with Biotechnology

Would you say you are very familiar, somewhat familiar, not very familiar or not at all familiar with biotechnology?



Consistent with static levels of familiarity, there has been no overall movement in overall levels of interest about biotechnology. However, there has been some notable change in the level of interest that Involved Canadians show toward this technology, due in part, we believe, to the continuing high level of media coverage of biotechnology-related issues. Focus group findings suggest that while most members of the general public find the area complex and technical, Involved Canadians are increasingly taking notice of the potential of this technology to make both a positive and potentially negative impact on their lives.

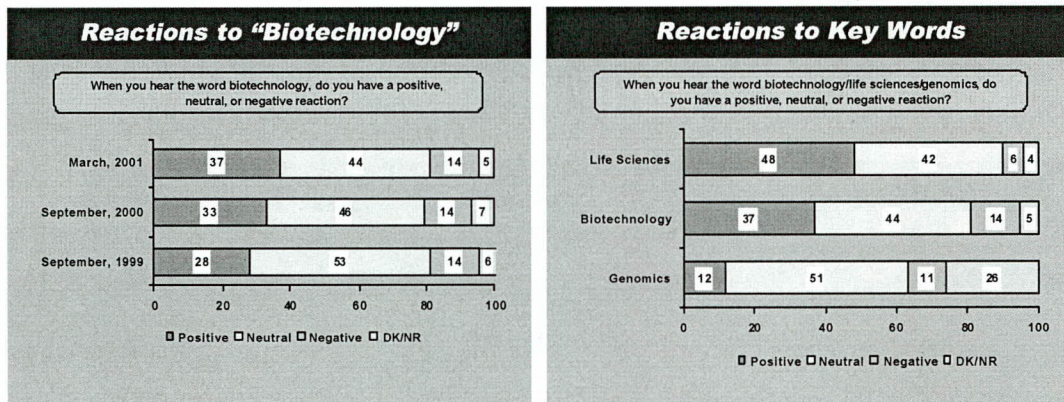


Top-of-Mind Disposition – Support, Opposition and Semantics

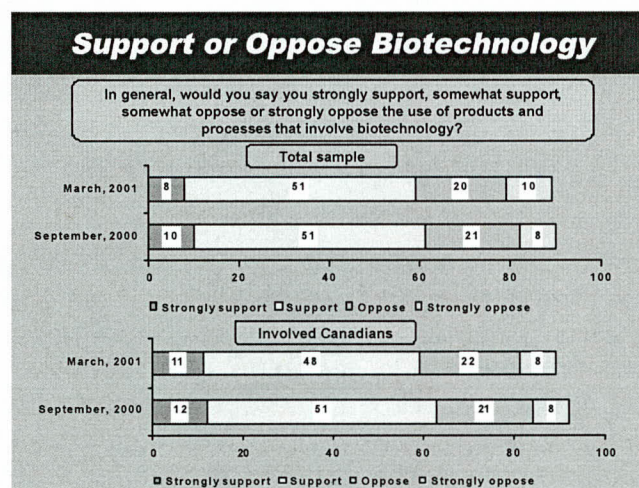
The predominant top-of-mind reaction to both the word and the subject of “biotechnology” remains neutral to positive. Overall, a clear majority hear a positive connotation, and positive sentiment is growing over time. The graph below suggests that the growth in positive sentiment has occurred at the expense of the neutral category. A core of 13% continue to hold negative top-of-mind connotations of biotechnology – this number has remained largely unchanged since the first wave of research conducted for the BACC in September of 1999.

Other words and phrases, like “life sciences” and “genomics,” were also tested in this wave of research. The phrase life sciences evoked more positive sentiment than biotechnology, while genomics tended to evoke more negative sentiment. Focus group research provided further insight into the appeal of life sciences. While it certainly met positive reaction, it did not connect at all with the field of biotechnology. Conversely, people tended to be more equivocal about genomics – more than one quarter could not offer an opinion. Overall, it was very clear in the focus groups that biotechnology was the most appropriate word to associate with these technologies, both because it carries the appropriate meaning and

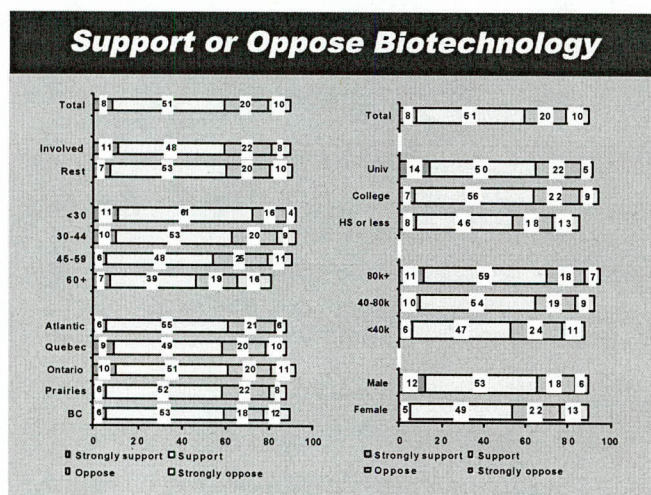
because it does not possess negative connotations for most people. Details of the relative merits of the three words/phrases is discussed in more detail in the focus group section of the report.



Overall, top-of-mind sentiments toward the subject of biotechnology tend to be more positive than negative – slightly fewer than two-thirds say they support biotechnology, while about three in ten say they oppose it. This remains largely unchanged from the last wave of research. Among Involved Canadians as well, levels of overall support and opposition remain virtually unchanged over the past year.



The data suggests that there are some notable demographic differences in levels of support and opposition toward the technology. In general, audiences that tend to express higher levels of support include men, those with higher levels of education and income, and young people. Conversely, segments of the populace that express higher levels of trepidation toward the technology include women, those with lower levels of education and income, and those over 60 years of age.

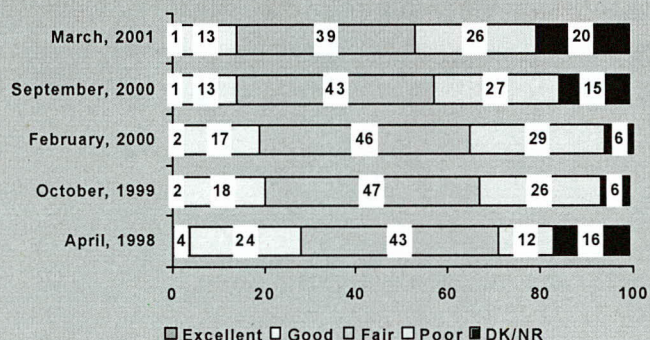


Federal Government Performance

There has been continued weakness in the public assessment of the federal government's performance in the field of biotechnology. Fewer people are willing to give the government excellent or good ratings and those numbers have been eroding steadily over the past year. Of note, the number who suggest that they don't feel they possess enough information to provide an assessment is growing, suggesting that information dissemination remains a challenge for the federal government. While these ratings are clearly quite weak, other survey work by Earnscliffe/Pollara and others conducted over the past several years suggests they are in part a reflection of broader attitudes toward government in Canadian society. Given the virtual lack of knowledge about what the government does in the field, the assessments could not be related to *actual* performance.

Federal Government Performance

Would you say the federal government is doing an excellent, good, fair or poor job in the area of biotechnology?

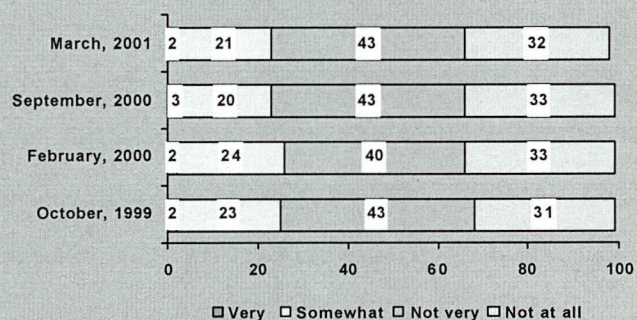


Regulation of Biotechnology

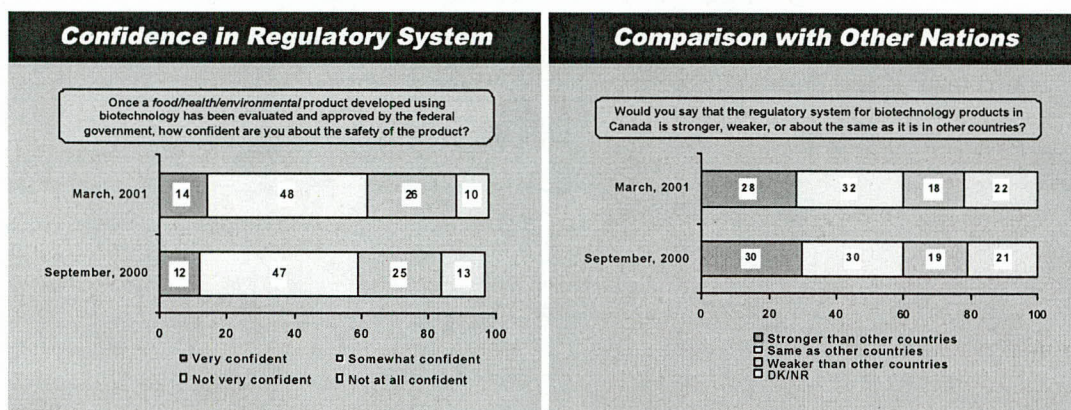
Canadians, by and large, have little understanding of Canada's biotechnology regulatory system, something that has not changed markedly over the four waves of research. Only a small fraction of Canadians claim strong familiarity with the regulatory system as a whole or with the way research is conducted into the safety of biotechnology products.

Familiarity - Regulatory System

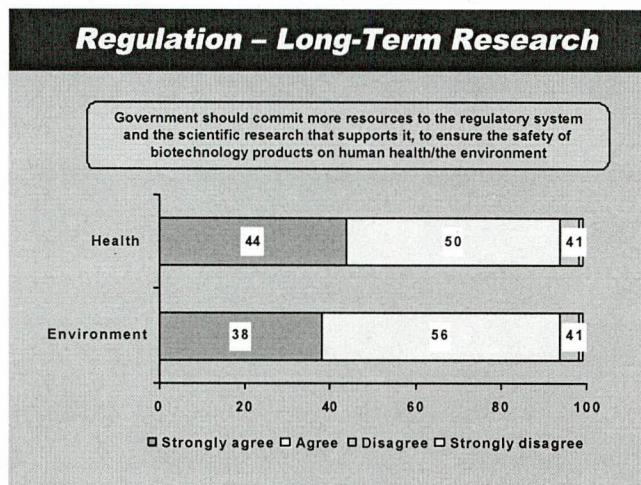
How familiar would you say you are with the ways in which the federal government regulates biotechnology?



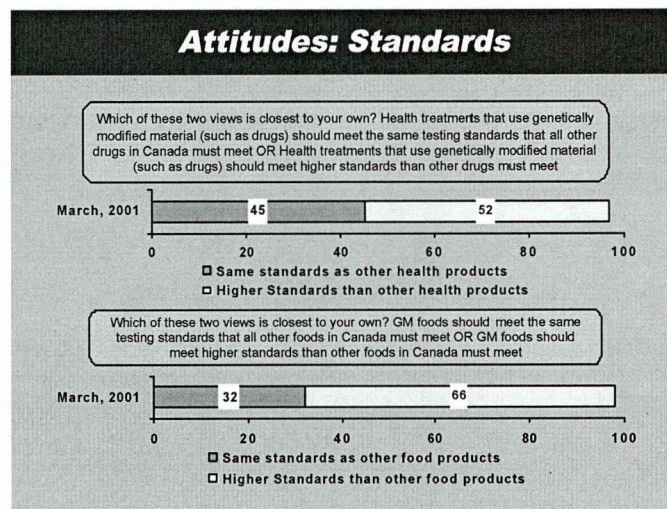
Nevertheless, despite the lack of knowledge, a majority of Canadians continue to presume things are working the way they should. A two-thirds majority express some level of confidence that federally approved products are safe, while about one third are less certain, including about 10% who hold strong reservations about the system. Confidence levels also extend to the view that the Canadian regulatory system compares favourably with that of other countries.



At the same time, there is a clear continuing demand from Canadians for an enhanced government commitment to the regulatory system for biotechnology, particularly in the area of long-term research of potential health and environmental impacts. This demand has been identified in all four waves of biotechnology research and continues to be the most important demand Canadians make of government in this field.



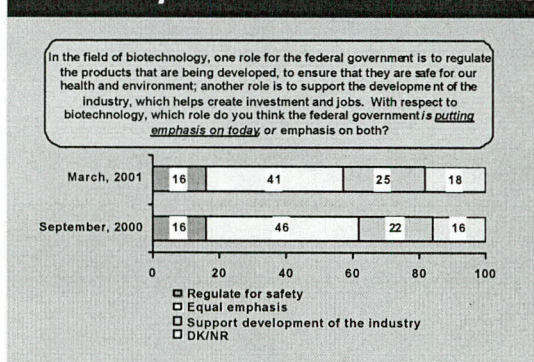
The demand for increased regulation is reflected in the underlying opinion that biotechnology approvals should require higher testing standards than other product approvals, particularly for GM food products.



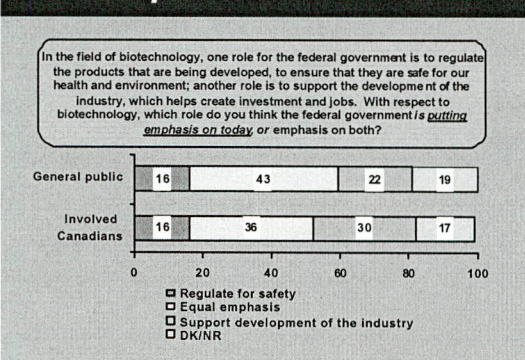
Government Priorities

Consistent with research conducted last September, a plurality of Canadians feel that the current government approach to biotechnology is equally balanced between stewardship and promotion. Among Involved Canadians, more lean toward believing that promotion is the main current priority of government, although a plurality believe that there is an equal balance.

Stewardship Versus Promotion - Current

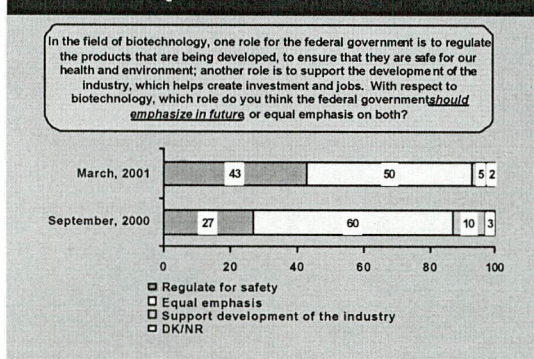


Stewardship Versus Promotion - Current

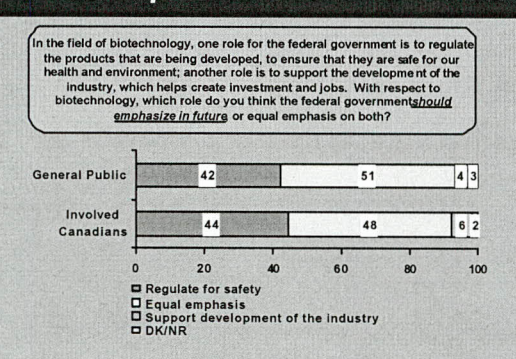


Turning toward priorities for the future, a majority of this sample of the general public indicate that the "equal balance" approach is most appropriate. However, there is fairly clear evidence in the data of a movement toward stewardship as the main priority, particularly among Involved Canadians, more of whom say stewardship should be the main priority; rather than "equal balance."

Stewardship Versus Promotion - Future



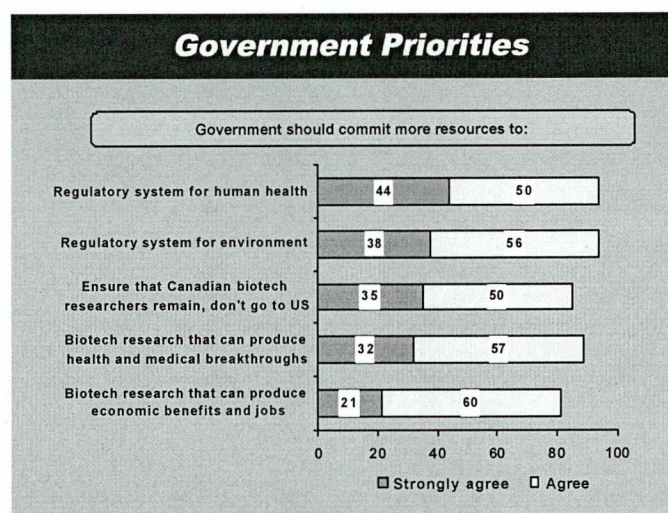
Stewardship Versus Promotion - Future



This public preference for an emphasis on government stewardship is reflected in other survey data as well. Respondents were asked about preferred areas for

government resource commitment, and the results showed that the regulatory systems that govern human health and the environment were the top priorities.

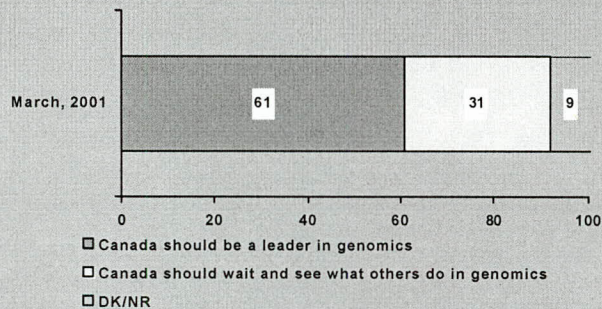
The strongest economic priorities fall in the area of preventing the brain drain to the United States and other countries. Supporting research that creates economic spin-offs, while obviously important, was not as resonant to survey respondents as other priorities in the realm of stewardship.



That being said, it is clear that most Canadians do embrace the idea that Canada can lead the world in this field. Focus groups as well as the survey data suggest that Canada should move forward to ensure that it does not fall behind other countries in the field of biotechnology. Indeed, focus group discussions illuminated a key point about how the nuances of opinion work on this issue. People don't see stewardship and promotion as a "zero-sum" game – both can and should be pursued, but that primacy is naturally assigned to the stewardship function - because the technology is seen to so materially affect people's lives.

Support for Genomics Leadership

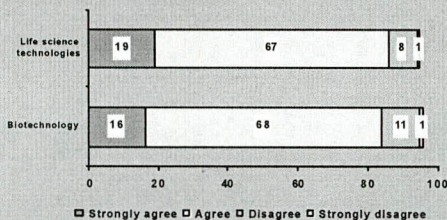
Which is closest to your own view? Genomics is a field of endeavour that I think Canada and Canadians should be leaders in, because it promises health and economic benefits OR Genomics is an area that Canada and Canadians should wait to see what others do, because it involves dealing with an issue that makes me uncomfortable.



To illustrate the point about Canadians' recognition of the importance of these technologies to the future, the data shows that Canadians make a positive connection between biotechnology and information technology and the potential that these technologies hold for our economic future. As importantly, the vast majority of Canadians accept the idea that a government role in helping to foster the development of these technologies does ultimately provide economic benefits to the nation and its people.

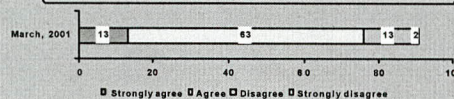
Connection between Biotech & IT

In the same way as the information technology industry has provided economic growth and good jobs for Canadians, life science technologies/biotechnology has the potential to do the same for Canada in the years to come

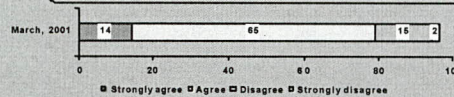


Rationale for Promotion: IT Example

Government assistance to the information technology industry in the early stages of its development helped it to become a world leader, providing jobs and economic growth to Canada



Government assistance to the biotechnology industry would help it to become a world leader, providing jobs and economic growth to Canada in the same way as it helped the IT industry develop in the 80s and 90s



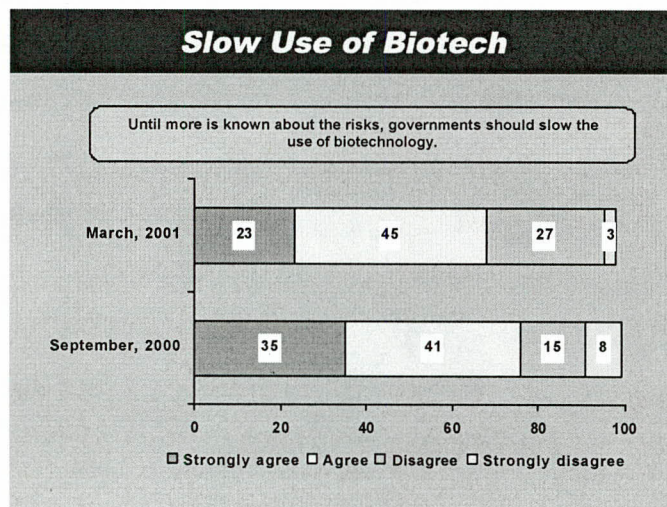
The Question of Risk

As we have suggested in previous waves of research, assessments of risk and, in particular, risk/benefit ratios are central to understanding public attitudes toward biotechnology. Our research suggests that it is these assessments that lie at the root of public attitudes. Among the most notable findings garnered in previous waves of research is a strong correlation between a preferred emphasis on stewardship and the uncertainty people carry about biotechnology and its long-term risk. Because of its importance, each research wave has probed the risk issue to ensure the phenomenon is thoroughly understood. In general, the results have been quite consistent.

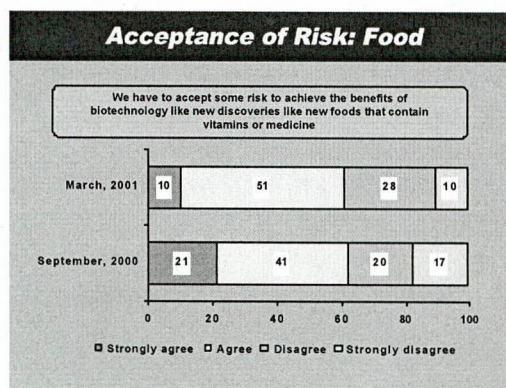
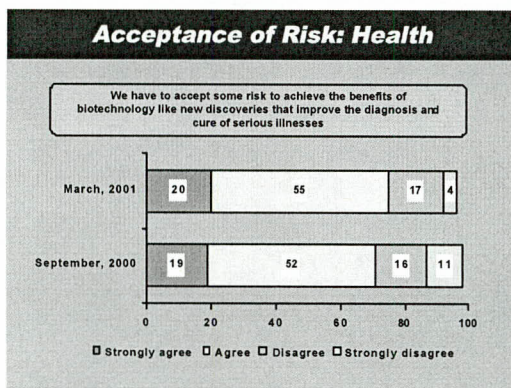
- The more significant the benefit (health/medicine being the most powerful), the more acceptable the risk.
- In virtually every formulation, there is a quite small percentage of people who *strongly* disagree (the best indicator of settled negative opinion) with proceeding to reap the benefits despite the risks.

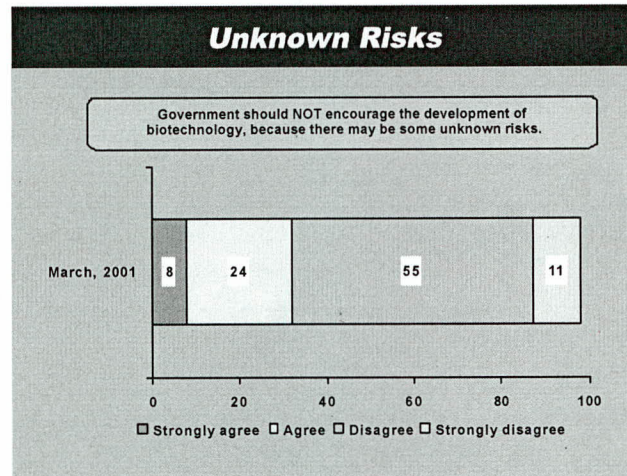
This survey tracked a number of issues involving risk and risk/benefit equations. Overall, the findings suggest that there has been some movement toward the center: that people are reflecting more equivocal views toward the issues and, in particular, greater consideration of issues relating to risk. Focus group discussions suggest that this movement toward the center is really a reflection of deeper levels of awareness and, concomitantly, higher levels of knowledge that these technologies can provide both risks and benefits. That being said, the net risk/benefit equation for most people remains positive. While fewer express extreme views, the overall proportions in agreement with the risk/benefit propositions in the survey remains similar to results found in previous waves of research.

The most prevalent negative driver in the realm of biotechnology is rooted in concern about long-term risks and unknowable outcomes that these technologies may produce. In particular, potential long-term risks to human health and the environment are what concern Canadians most. There is no doubt that absent consideration of benefits, the presentation of these risks drives many people to express concern about the technology.



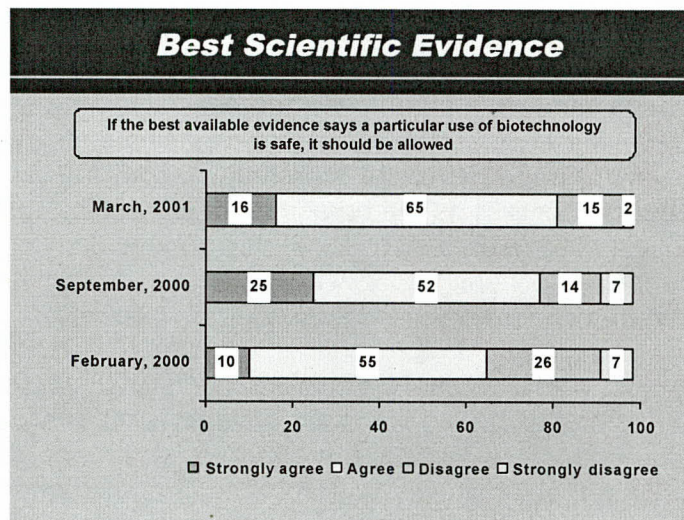
At the same time, people recognize that there are important benefits to be accrued from these technologies, and that some level of risk has to be taken in order to receive them. Results of this survey illustrate this finding in two ways: first, when risk statements are posed accompanied by the potential benefits (especially health benefits), a majority will be drawn to agree that the benefits outweigh the risks. Second, people resist agreement with the idea that because of the risks, these technologies should be stopped or governments should completely ban their use.



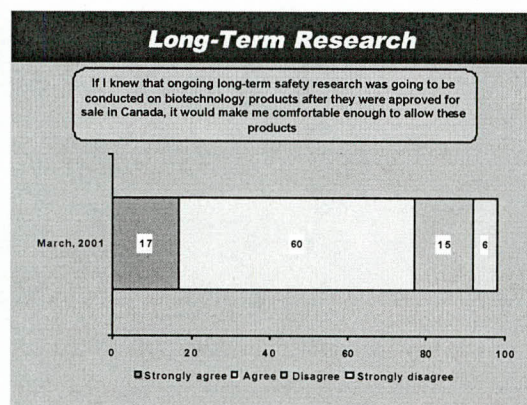
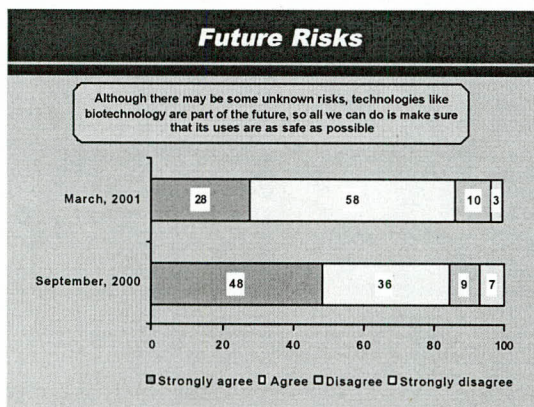


Ultimately, the risk most are willing to accept is best characterized as calculated risk that is taken with the view of realizing a substantial benefit and with a keen eye on managing the potential downsides. Our assessment is that some degree of risk is acceptable to Canadians, but only in the contexts of substantial benefit and diligent government stewardship.

The risk case is most widely compelling to Canadians when it is built on science. The data below suggests that the vast majority continue to believe that science should be the primary guide to decision making about biotechnology applications. This finding was strongly reinforced in focus group discussions, where respondents were very reluctant to accept arguments based on fears or emotion. Ultimately, if an application is deemed safe by the "best available" scientific research, most say that this is the best that can be expected. However, as the section above illustrates, in the arena of biotechnology, people expect that research to be comprehensive.



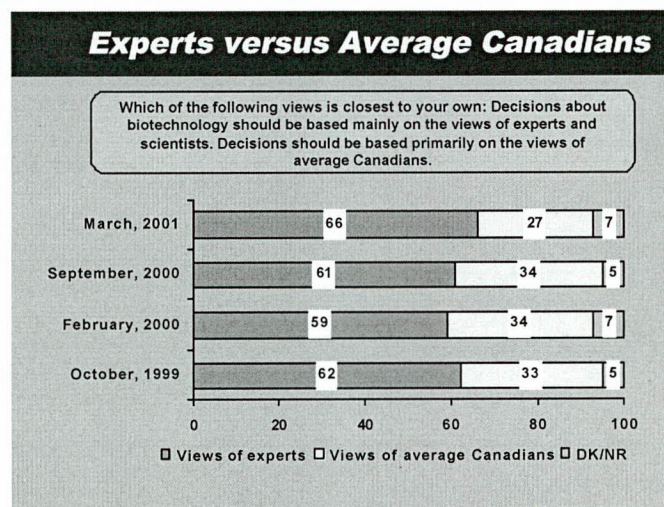
Most Canadians have accepted the fact that risk is pervasive in modern society and that managing risk is about as much as can be expected, given the level of innovation and the extent of progress that humans are making in so many fields. However, in the field of biotechnology, people clearly expect that there will be very high levels of diligence by government to manage risks. Most importantly, they say that those risks must be managed not just before products are approved, but over the long term, through surveillance and long-term scientific research.



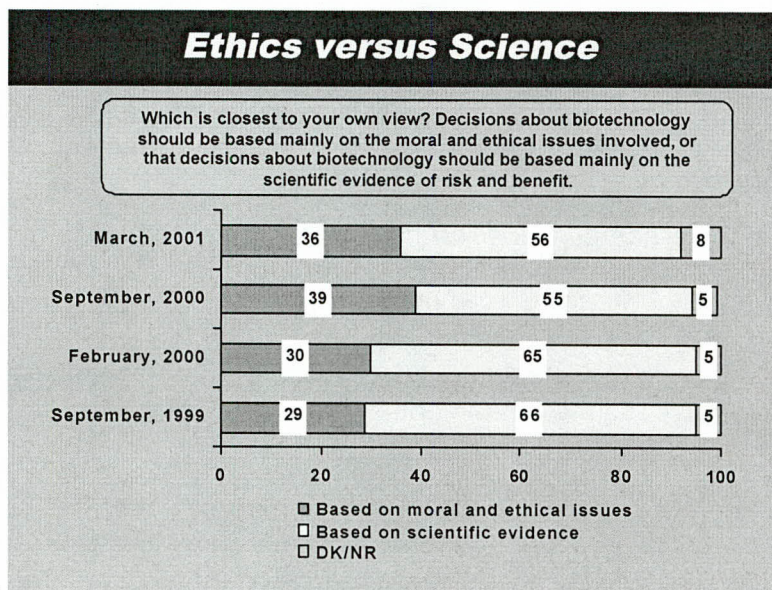
Decision Making

This wave of research reflects a continued, notable movement in preferences regarding decision making about issues related to biotechnology. We believe that this shift is reflective of deeper levels of knowledge about the issues involved among interested people, as well as the broader shift toward the “middle ground” discussed earlier, illustrated in data throughout this survey. Survey respondents were asked two general questions about who is best placed to make decisions, and what kinds of criteria should be included in decision making.

In terms of who is best placed to make decisions about these technologies, the majority view, which is becoming increasingly dominant over time, is that individual Canadians themselves do not have the knowledge or ability to make effective decisions on these issues, and that experts (scientists, university researchers, government researchers and policy makers) are better placed to make them. This is particularly true among the general public. However, according to our focus group findings, it comes with two key caveats: first, they want to ensure that there are provisions in place to review decisions over time, as new technologies to evaluate impacts are developed. Second, many expressed a preference for a highly transparent decision-making process, which is wedded to the importance of informed choice, something that many respondents have asked for in every wave of our research. To paraphrase the consensus view: “beyond establishing safety, the government should make products available and allow individuals to make their own decisions about biotech products.”

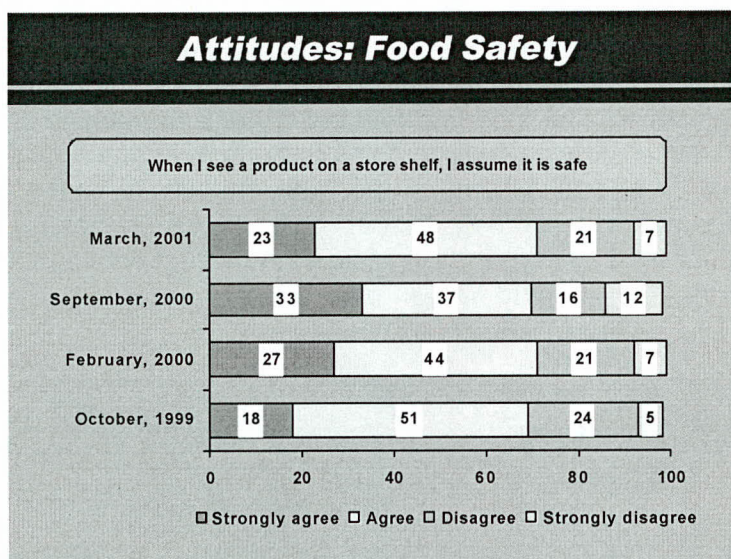


In terms of decision-making criteria, the data reveals majority support for the primacy of scientific evidence, although there has been an increase over the past year in the number of respondents who suggest that moral and ethical issues should be of primary importance in decision making about biotech products. Focus groups illuminate these general findings, revealing the emergence of several key associated issues on this question. First, deeper levels of awareness of different types of applications, particularly of those that are highly invasive and may involve humans, appear to be driving the level of support for moral and ethical considerations playing a central role in the decision-making process. That being said, upon discussion, science remains the primary criteria for acceptability for the wide majority of applications, in the wide majority of cases. While most want moral and ethical questions to be part of the decision-making process on certain issues (such as cloning), the principle of individual choice usually trumps peoples' willingness to employ moral and ethical issues as the arbiter of decisions.

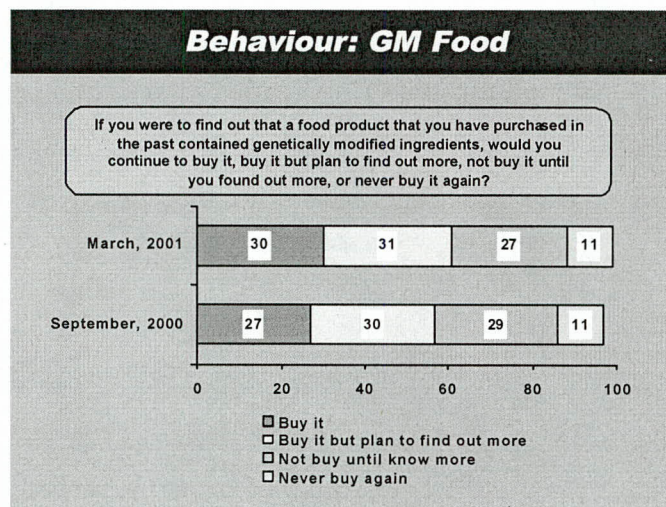


Genetically Modified Food

Consistent with previous waves of public opinion research, the survey results suggest that a significant majority of Canadians continues to believe that food on store shelves is safe. That being said, many Canadians have taken notice of the GM food issue, which has proven to be of concern to a core minority segment of the populace.



The GM food debate has continued to have some impact but has not proven to have catalyzed opinion, and there has been no evidence of dramatic change in attitudes toward these products over the past year. To a large extent, what we found was that on a personal consumption level, there is some discomfort with GM food and uncertainty about its benefits but most Canadians have not determined that GM foods are fundamentally risky or unsafe.



Communications Issues

This wave of research was largely focused on communications and messaging issues associated with biotechnology. Three areas of communications testing were carried out – messages both positive and negative toward biotechnology in general, as well as messages about government actions and priorities.

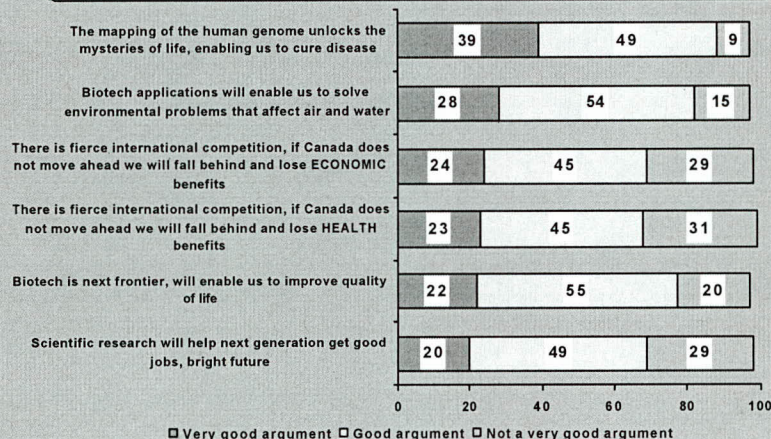
The main findings in the area of messaging about biotechnology are as follows.

Messaging

Messaging around health benefits and unlocking “the mysteries of life” is the strongest of the positive messages tested in this wave of research. Canadians clearly see these as the most important and most compelling benefits of the technology. Messaging that involves discussion of environmental product benefits is also quite strong, but less so. Messages that discuss economic benefits tend to be even less appealing. Of note, messages that illustrate some of the potential downsides of not embracing these technologies were met with consistent levels of lukewarm interest, with one notable exception – preventing the brain drain.

Arguments in Support of Biotech

I would like to read you some statements in support of biotechnology. Please tell me if in your view, the statement is a very good argument, a good argument, or not a very good argument.

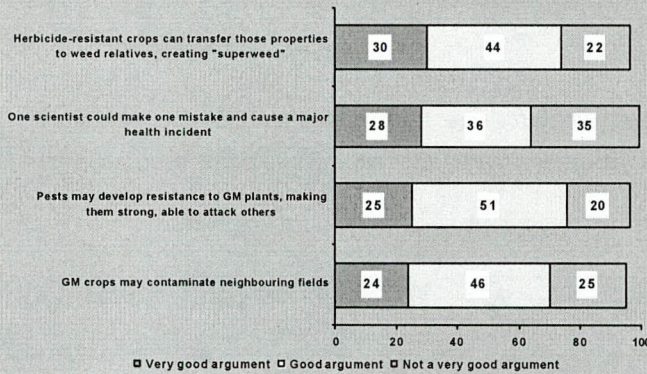


On the negative side, each of the arguments tested similarly, with moderate levels of strength. Of note, the idea of a scientist's mistake causing a serious problem touched a nerve among a significant number, although it was also the argument that many others said was least convincing to them. Argumentation about upsetting the ecosystem balance is resonant, especially the ability of certain pests to grow more resilient as a result of pest resistance modified into crops. The negative messaging tested (current argumentation used by anti-biotechnology groups) is more powerful than previously tested negative arguments, which tended to be thin on specifics. We would argue that this also conforms to higher levels of consideration being placed on risks, illustrated in some of the data above.

However, the positive messaging surrounding the health and environmental benefits to be discovered remains stronger – it taps into people's underlying sense that biotechnology may provide society with important and exciting medical breakthroughs.

Arguments in Opposition to Biotech

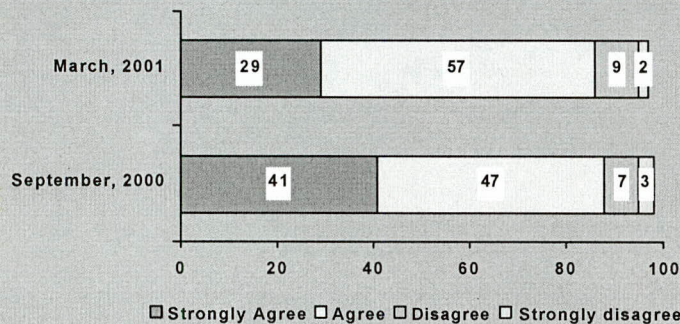
I would like to read you some statements in opposition to biotechnology. Please tell me if in your view, the statement is a very good argument, a good argument, or not a very good argument.



The overall government positioning on biotechnology continues to be accepted by a wide majority of Canadians. Almost nine in ten say that the primary role of government is to gain the benefits while managing the risks. Interestingly, only 2% strongly disagreed with that statement, suggesting that gaining the benefits, at some level, is an acceptable and a reasonable objective to strive for.

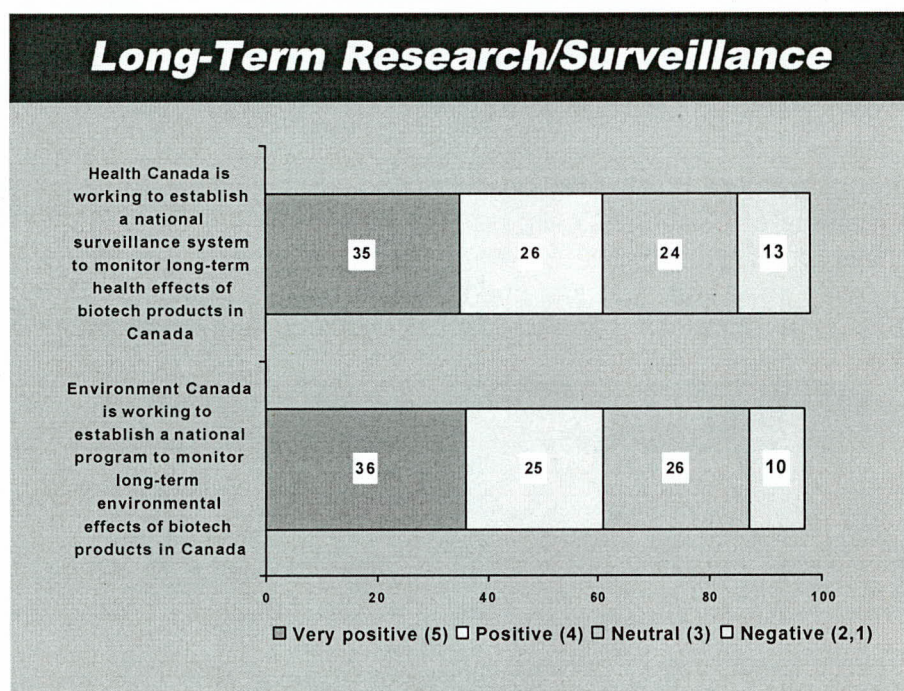
Government Positioning

The primary function of the federal government in the field of biotechnology is to understand and manage the risks while working to gain the benefits

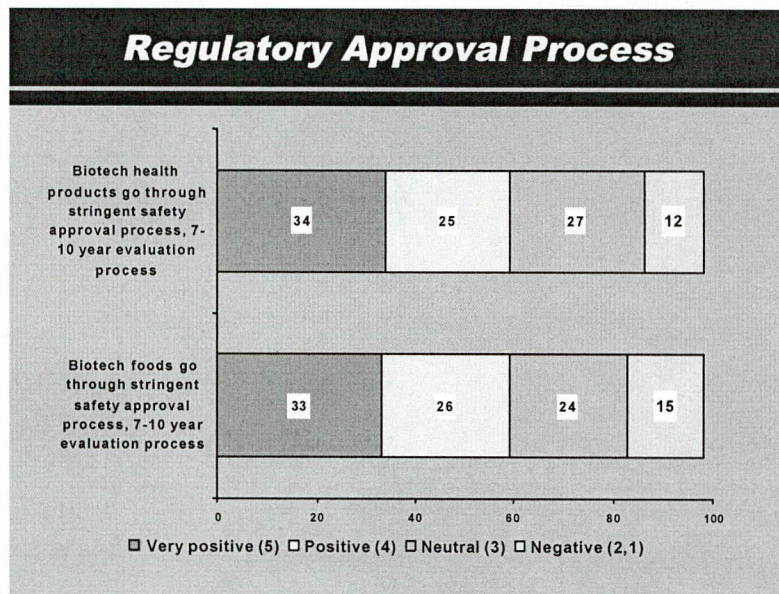


Earnscliffe/Pollara tested specific messages about government roles and activity, in both the survey and in focus groups. Most of the messages have some positive impact on attitudes, but none stood out in the survey as having a substantial effect. The focus group results in the following section outline in detail aspects of specific messages that tended to connect with people, and aspects that did not.

The messages that were most resonant related to long-term research and surveillance into health/environmental impacts, closely followed by messages that focused on the regulatory approval process. This is consistent with the kinds of priorities that Canadians have suggested are of primary importance in relation to biotechnology. The graph below illustrates the results.



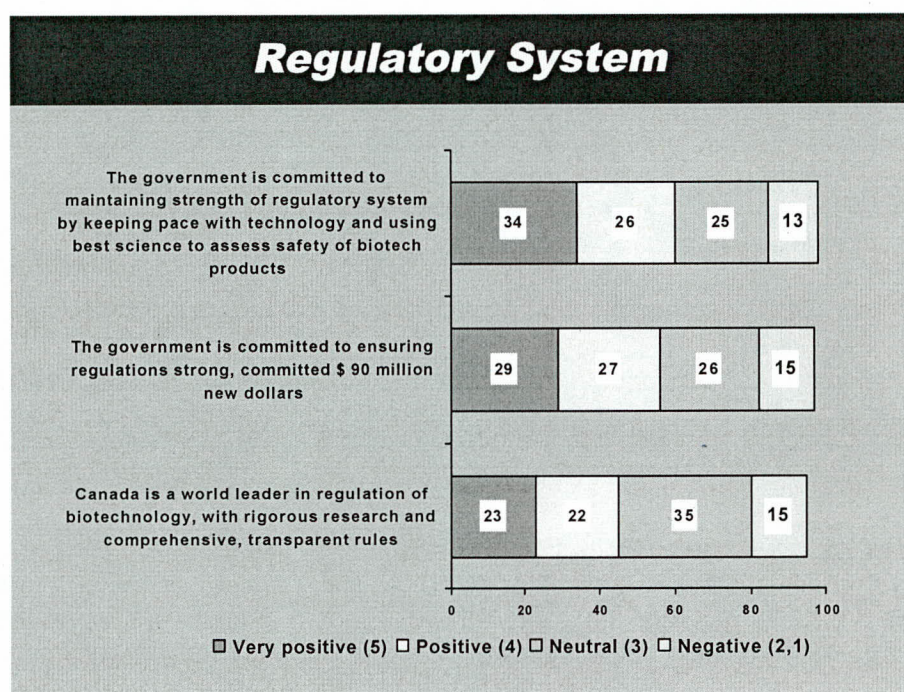
Messages about the nature of the regulatory approval process garnered a relatively high level of resonance with respondents - almost as strong as messages about long-term research and surveillance. Of note, descriptions of GM food and health approval processes were found to have equal impact.



Three types of messages relating to the regulatory system were tested. One suggested that the system is committed to keeping pace with technology in order to evaluate products; another suggested that Canada's system is a world leader; and a third pointed out new spending commitments for regulatory programs.

The gap between these three messages was significant, the first being much stronger. The focus groups provided some insight into the difference. Messages should be constructed in a way that asserts the importance of progress and illustrates government effort to address the considerations that biotechnology raises. However, they should minimize assertions about how effective the system is. Any message that smacks of being self-congratulatory is rejected outright.

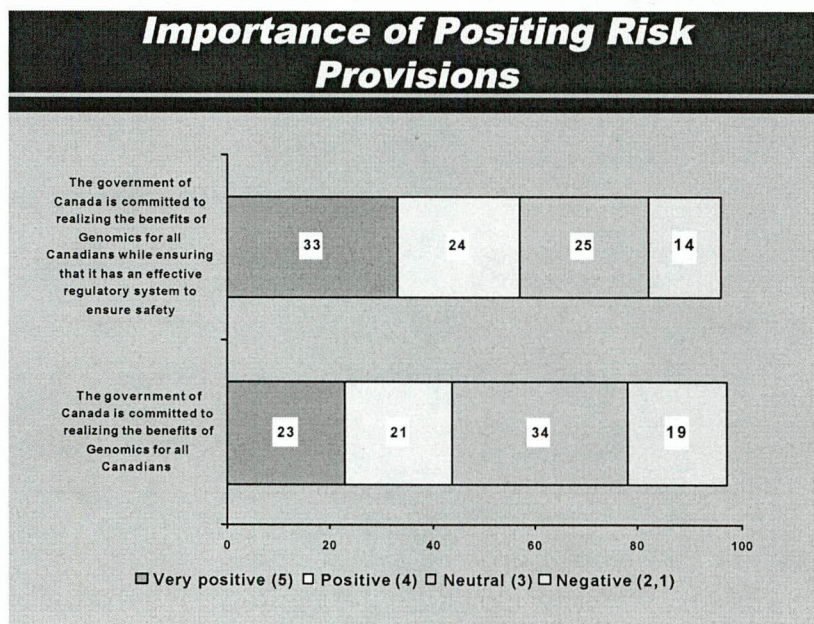
The third message that was tested (regarding new dollar commitments to regulatory research) appealed to some but was somewhat less appealing than other messages. The focus groups results indicated that many people don't have any sense of context when large dollar figures are presented. They don't have a relative sense of whether it indicates a large or small commitment (compared to other countries, for example). Others begin to raise questions about efficiency of government spending when large dollar figures are used, which tends to dampen receptivity toward the message.



One of the major issues that was proposed for investigation in this research was the issue of how best to position benefit messages – on their own, or in the context of safety and regulatory systems.

One of the ways of investigating this involved testing a single message first with no reference to safety and regulatory processes and then, with a reference to them. Half the sample receive one version, half the sample received the other. This message related to the importance of government seeking to garner the benefits of genomics for all Canadians. The message that made reference to safety and regulatory measures in the context of outlining these benefits was much more positively received by respondents. The result suggests that the

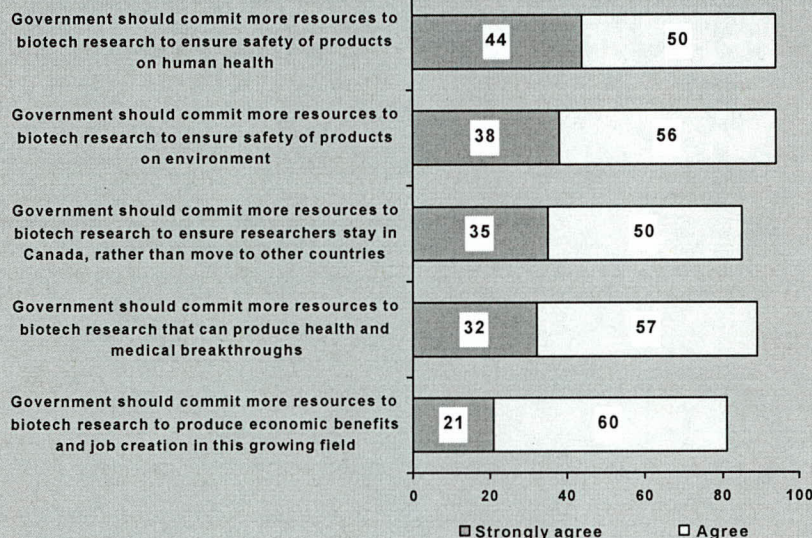
impact of benefit messages is stronger when messages about management of risk are closely tied to them. The focus groups found similar results.



Finally, a number of messaging constructs that relate specifically to government commitments were asked of respondents in the agree/disagree section of the survey.

The test evaluated whether Canadians accept a decision to commit government resources to several ends associated with biotechnology. The findings suggest that support to regulatory science and health and medical benefits are clearly of greater importance than strict economic benefits. However, when the issue of preventing the "brain drain" is raised, Canadians become more likely to see this as a rationale for a greater government commitment.

Messaging: Government



Conclusion

This survey marks another key point in the evolution of opinion trends associated with biotechnology, and provides insights into several emerging issues. Although there remain low levels of familiarity and interest among the general population, the spread of awareness, coupled with extensive media coverage, has had an impact in the depth of knowledge that interested people, particularly Involved Canadians, have in these technologies. This growth in knowledge has moderated views, evidenced by a movement away from extreme positions and toward the centre of the opinion spectrum. However, it has not catalyzed opinion either for or against the technology. While assessments continue to be made on a case-by-case basis, overall, twice as many Canadians support the development of these technologies as oppose them. In the absence of awareness of clear benefits opposition increases, but the awareness of benefits and risk management initiatives increases support. Scientific evidence is a key driver of attitudes, as is the principle of informed choice. While very few are willing to ban most of these products because they believe in individual choice, most believe they have a right to know the contents of the products they purchase and consume.

QUALITATIVE FINDINGS

Introduction

In this wave of research, a total of eight focus groups were conducted, four with Involved Canadians and four with the general public. Many of the issues discussed in this report have been tracked over the course of the three previous waves of qualitative research, and will be discussed in the context of trends. In this wave of research, the main new areas of investigation involved communications messaging, and GM food labeling. These findings summarize the results of these focus groups.

Awareness and Familiarity

1. Top-of-mind awareness of biotechnology has leveled off, but remains quite high among Involved Canadians.
2. Most people associate biotechnology with health and medical benefits, or with GM food. As found in previous waves of focus groups, those initial associations tend to be a barometer of deeper attitudes toward biotech. Those who initially cite health or medical benefits tend to lean positively in their outlook toward the technology. Those who initially cite GM food applications tend to lean negatively.
3. Respondents were asked what kinds of associations and connotations are evoked by three key words/phrases: biotechnology, life sciences, and genomics. Consistent with previous waves of research, different types of language used to describe this field evoked profoundly different attitudes.
 - The word "biotechnology" is the word that is most closely associated with the kinds of applications and processes that were being discussed in the groups. Overall, it tends to connote more positive than negative attributes. For a small but vocal minority, biotechnology has very negative connotations. Virtually all participants said it was the most appropriate label of the three tested.
 - The phrase "life sciences" tends to be broadly associated with research and science, and generally has a positive connotation, although the phrase does not elicit strong views. However, it is seen as a very general

phrase connoting science in general with no real association with biotechnology. When asked about whether it connects to the applications and processes discussed in the focus groups, most felt that it did not. Some suggested that if used to describe these processes, it would be seen as a means by which advocates would try to “cleanse” the language to make the subject appear more palatable – certainly a negative from their perspective.

- The word “genomics” is much less well known or understood by Canadians – many in the focus groups suggested that they had no real idea what the word means. Some who had a sense of the word tended to express many of the same kinds of feelings as were elicited by “genetic modification” when it was tested in the past. Often, people connect this word with manipulation of human genes, cloning, and other more invasive human-related technologies. While some hold a positive view of this word, more hold a negative view and tend to conceive of it in a relatively narrow way (i.e., invasive human applications).
4. The proportion of Canadians who are interested or familiar with biotechnology and its issues remains largely unchanged, but those who are aware, particularly Involved Canadians, are more knowledgeable about more issues than found in previous waves of focus groups. In most of the Involved Canadians groups, the level of understanding was notably higher and discussions were much more complex and comprehensive.
 5. While there remain small core segments of strong supporters and opposers of biotechnology, the groups reflected a fairly clear overall movement toward the centre. The majority tend to be people who have some trepidation, but are on the whole mildly positive toward biotechnology, or to some applications.
 6. We would suggest that this is consistent with findings about the relationship between awareness and overall attitudes identified in previous waves of research - that as people become more aware of biotechnology, attitudes tend to become more mixed, tempering concern about risks with recognition of benefits. As awareness grows, attitudes become more complex and nuanced, and many statements come with qualifications. However, higher levels of awareness do not necessarily correlate with higher levels of opposition toward biotechnology. Most people believe that each application has both drawbacks and benefits, and they seek to make risk-benefit assessments on a case-by-case basis.

7. The focus groups conducted in Montreal were markedly different than the focus groups conducted in the other three cities, and markedly different than groups conducted in that city in previous waves of research. In those groups, there were generally more negative than positive sentiments toward biotechnology as well as palpable distrust of the government role in this field. The survey data revealed no evidence of a broader shift in attitudes in that province. It would appear that these groups were simply a bit of a recruitment anomaly.
8. Most had little idea about federal government roles or responsibilities, or how the regulatory system works. Especially among members of the general public, there is little awareness of how government might relate to this industry at all. Most assume that some type of regulatory framework is in place, and a few thought there might be some form of economic support in the form of research and development incentives.
9. Women tend to express higher levels of internal tension about these technologies than men. In particular, they often give higher levels of consideration to the risks involved in the process of developing these technologies. In most cases, however, women remain cautiously optimistic about biotech applications, particularly in the health field. At the same time, women are also much more likely to expect government to be an active and strong steward of health and environmental safety, and make this their top (sometimes only) government priority.

Applications and Risk

1. Some new applications were tested in these focus groups, as well as some that have been tested in previous waves. Consistent with previous research, participants expressed a range of views about biotechnology product applications, with health applications by far the most acceptable and food applications the least acceptable.
2. The new application that was most widely acceptable was the new technology to stimulate insulin production to treat sufferers of Type 1 Diabetes. Applications involving the growth and use of biomass energy products were generally found to be appealing, although those who tend to be most concerned about biotechnology often raised questions about the risks to the ecosystem. Applications related to GM food products continue to evoke fairly negative reaction overall. Of note, applications that promise environmental benefits tended to arouse more concern than they have in the past, chiefly

because a number of people have begun to focus on the long-term impact of these applications on biodiversity and surrounding ecosystems.

3. The main concern that drives perceptions of risk relate to long-term impacts on health or the environment. Over the four waves of research, concerns about these potential long-term impacts have become one of the most important drivers of negative perceptions.
4. Acceptance of biotechnology applications continues to be based on a risk/benefit analysis, evaluated on a case-by-case basis. The pattern of analysis used by respondents is very similar, with certain factors having greater levels of influence than others. Respondents tend to be more supportive of applications and products that have the potential to positively affect them personally, and that provide a health or environmental benefit that is significantly greater than products or technologies in that specific field currently provide. Conversely, if there is no compelling public purpose rationale for the application, participants often reject it. Some of the factors that undermined views of applications included:
 - if the potential benefits were viewed as accruing to a subset of society only;
 - if the biotechnology application were to entail the manipulation of the genetic structure of higher order organisms;
 - if the application entailed the insertion of genes across plant/animal/human boundaries;
 - if the purpose was purely for cosmetic improvement of a product.

The assessments of various applications have remained highly consistent over the past three waves of research, with health applications leading, environmental applications second, and food applications the least acceptable.

5. In the end, the framework for analysis that most people use continued to be what we refer to as "marginal personal benefit." The main driver of support for any biotech application is the purpose (or rationale behind) the application, while the driver of opposition is the process by which it is created (the level of invasiveness, the extent of genetic manipulation across families of organisms.) Most people assess each application on these two separate dimensions, then combine them in a risk/benefit equation (benefit – risk = X). If X is negative, people will suggest that the application is unacceptable to them.

The Federal Government's Stewardship Role

1. Consistent with previous waves of research, there remain very few Canadians who have any sense of the regulatory role the government has, and what kinds of systems are in place to evaluate the safety of these applications. In most groups (even among Involved Canadians) only after prompting did some suggest that the government probably has rules governing what kinds of safety tests products must meet, but none knew what those rules consisted of at any level of detail.
2. Although few could say whether the federal government was doing an effective job or not in this area, the first instinct of some respondents was that it might not be. The most prevalent reason for that was a general sense of malaise about government and political leaders. The other key factor has to do with how well government studies risks, particularly long-term risks, and how well it is able to keep up with innovations in products as well as methods of testing and evaluation. A few people, particularly those who are strongly opposed, voice concern that these technologies are moving forward without appropriate measures being taken by the federal government.
3. However, when presented with a question about whether they feel safe about health and/or food products and their respective approval processes, attitudes were much different – people were much more positive. The vast majority suggested that they feel confident in Health Canada's product safety approval processes. A majority also feel that food on grocery store shelves is safe, with the exception of the "core" opposers of biotech and GM food, who express skepticism about whether food on shelves is safe.
4. When asked how Canada's regulatory system compares to systems in other countries, there was a virtually universal sense that Canada's regulatory and safety system, particularly in the area of health, is probably the same as or better than that of other industrialized nations. Most often, these views are not based on any knowledge about what the standards and practices are regarding biotechnology, but because of positive associations they have with Health Canada on other issues. Of note, many people cite the drug approval process as a reference point for their assessments of biotechnology products, and assert that those processes are quite stringent, leading them to suggest that biotech approval processes probably are as well. Driving those sentiments is a sense that it "takes longer" for Canada to approve products,

and a belief that Canada is more likely to reject certain drugs than other countries (particularly the U.S.).

5. With regard to the issue of risk, most participants understood that the development and use of biotechnology applications carry risk, and are willing to accept those risks in cases where the potential benefits seem important. If an application is thought to produce a substantial health or medical benefit, the groups suggest that people are prepared to accept a higher level of risk. However, concerns about risk are often top-of-mind with people, and unless those concerns can be abated by indications that someone is playing an active stewardship role, some, particularly those neutral to these technologies, can move negatively.
6. The vast majority continue to strongly believe that science should be the primary guide to decision making about biotechnology applications. While many people do see biotechnology as having moral or ethical dimensions that have to be considered (particularly in the area of human applications), health and environmental risks are the key criteria for approving products and processes.
7. There is a growing sense that chiefly experts must be involved in assessing the merits of biotechnology products. Many, particularly those in the Involved Canadians segment, suggested that it must be experts, rather than the general public, that ultimately make decisions about these products. One proposition that was raised in several groups is the idea of involvement of experts both inside and outside government (ideally at universities), both to ensure that the most rigorous, modern processes are being used to evaluate the products and to provide a check against corporate influence over the evaluation process.

The Innovation Agenda and Government's Support Role

In this wave of research, government's support role to the sector, and in particular its Innovation Agenda and the relationship between this agenda and biotech, were discussed with respondents.

1. Only a handful of respondents initially have a sense that the government might play a role in facilitating the development of industries like the biotech industry. In general, those who indicated some unprompted awareness of this tended to be those most concerned about it, worried that government might be, and might become further, beholden to

corporate interests. Upon discussion, others were more supportive of the role in general, a clear majority accepting the premise that was outlined in the focus group guide about the Innovation Agenda.

2. After some discussion (and prompted by the rationale outlined in the moderator's guide, which attempted to draw a parallel between support to the information technology industry and biotech), more were convinced that an innovation agenda should be a government priority.
3. Among those that accepted the Innovation Agenda, many harboured concerns about two issues. First of these is the role of politics and patronage in decision making. There is a widespread sense that politics plays a substantial role in government decision making, to the detriment of effective economic development. Second, concerns were raised that this function would take precedence over the government's regulatory role, which was seen as the first priority. In the end, most felt that economic support is appropriate and best carried out as sector-wide programs (like R&D tax credits) rather than targeted programs. Moreover, most also felt that government can both regulate and support industry, as long as the functions are clearly separated (ideally across departments.)
4. Aspects of the Innovation Agenda role that tended to drive higher levels of acceptance (in descending order of importance):
 - The ability to link Innovation Agenda resources with university labs and researchers
 - The ability of these kinds of research to better evaluate the safety and effectiveness of these products (through universities as well as government)
 - Concerns about a "brain drain" of young people to the United States
 - Facilitating access to products faster
 - The importance of high technology as a creator of value-added jobs (especially among involved Canadians - less so among the general public, who express a concern that those jobs will leave them behind).

Priorities for the Federal Government

1. Priorities for the federal government were clear and have been highly consistent over the four waves of research. The first priority is to ensure that the regulatory testing system is well resourced with human and financial

resources, and that the government ensures long-term ongoing study of potential health and environmental impacts.

2. At the same time, strong messages were heard from many respondents that government should partner with individuals and organizations at universities in Canada and overseas to collaborate in the stewardship of this field. Many saw collaboration with "independent researchers at universities" as important to the scientific and regulatory process, both to ensure that this research is consistently at the cutting edge of science and to help insulate the regulatory system from corporate influence.
3. Economic support to industry was deemed important, but much less so than health and safety regulation and research. There remains a significant core of 20-25% who express fairly strong resistance to the idea of government providing any significant level of support to biotech companies, or any companies at all. These people strongly feel that government and industry are already too close, compromising government's ability to play its stewardship role.

GM Food and GM Food Labelling

1. While few indicate that they are supporters of GM food, the GM food debate still has not catalyzed strong opinion. The vast majority of participants feel that food on grocery shelves is safe and has been tested by government, and while they may indicate some concern about these foods when asked, the concern is often as much about why people haven't been offered a choice about purchasing these foods as it is about whether the foods themselves should be on the shelves.
2. There is increasing awareness that a wide variety of processed foods contain GM ingredients. The actual proportion no longer generates the degree of surprise it did even a year ago. However, there is still some confusion about just how GM ingredients manifest themselves – many people still conceive of them as an additive rather than a constituent part of the food.
3. There continues to be a widespread assumption that the long-term risk of GM food ingredients cannot possibly be understood yet. Nevertheless, comparatively few people are willing to say categorically that they will not consume food with GM ingredients. In part, that is because despite the long-term uncertainty, few believe there are current safety concerns – they haven't heard anything about sickness or other negative consequences.

4. Discussion of potential functional foods and nutraceuticals created some interest among participants, some of whom saw their potential utility in the developing world. Usually, however, biotechnology opponents were able to cause a re-evaluation of that position by questioning the motive of producers, attacking patents issued to multinationals and raising the spectre of overdoses.
5. After discussion of GM food and food safety issues, the focus groups investigated options for GM food labelling. Participants were asked for their initial reactions to the idea of labelling, and then in turn were provided with a brief overview of some of the considerations involved in creating a labelling system for GM food. Following that, they were provided with the most likely labelling options and asked to discuss the pros and cons of each.
6. At first blush, almost to a person, people strongly advocated an "informed choice" approach to GM foods through labelling. As long as the science is sound, most people feel that the purchase of GM food should be up to each individual.
7. It was clear that most people initially regard labelling as a simple issue that requires little consideration because freedom of choice is the overriding principle. Most were quite perplexed to find that there were a number of potentially difficult policy issues involved.
8. After discussion of some of the considerations involved in labelling, for those least concerned or indifferent about GM foods, the extra cost or other potentially difficult consequences of labelling were sufficient to make them neutral on the issue.
9. However, most people remained fairly steadfast in their belief that a labelling system was required. In general, it seemed that people were so convinced initially about the ease of labelling that they felt uncomfortable changing their minds even after exposure to argument.
10. The issue that tended to garner the highest level of consideration was the issue of how a labelling system would affect our trading relationships in food – the import and export of food, including access to imported food products if those products were not allowed in Canada (because they wouldn't be labeled.)

11. The issue of segregating food at the farm level, and the costs that might impose on the system, was dismissed by many respondents, especially Involved Canadians. Many said that this was "the cost of doing business" in biotech food and if the costs were too high, then maybe biotech food should not be produced. Similarly, the argument that labelling might frighten people from buying did not resonate. First, many said that implied a paternalistic distrust of Canadians' judgement. Second, the merits of offering informed choice far outweighed the risks of some companies losing business.
 12. Respondents were then taken through a number of possibilities for the labels themselves. Again, it was pretty clear that most people had never given the issue any thought at all and were surprised that there could be so much complexity in something that appeared to be pretty simple at first. After discussion, the results were quite consistent across groups.
- **Labelling the process.** The issue once again reduces itself to the question of risk. Most people believe most previous forms of genetic modification have proven themselves to be safe. So participants overwhelmingly chose a narrowly defined option – labelling products whose ingredients have been modified only by the latest and most intrusive forms of genetic engineering. This is not an issue of consistency or principle. People do not reject GM food on that basis; they worry about the long-term risk. Hence the preference for identifying only those products they presume carry unknown risk. Strong opponents of GM food tended to agree because they have come to accept that most other genetic modification processes are "natural." For instance, most would cheerfully consume current crosses between broccoli and cauliflower because they believe them to be things that "could have" occurred in nature.
 - **Trace ingredients.** Most participants believed that allowing a trace of GM ingredients was more practical than insisting on 100% purity – as long as the threshold was low and commonly accepted. Since they know that they now consume GM ingredients in much larger amounts, it seemed reasonable to reduce GM content to a "trace." Strong opponents of biotechnology did not agree; they insisted on 100% purity before accepting that a product was GM free.
 - **GM or GM free.** Perhaps surprisingly, this was the one area where there was virtually even split opinion. In major part that was because few (other than determined opponents of GM foods) could see much practical difference to them as consumers. Opponents insisted on *GM free* as the labelling phrase

because that seemed an affirmative statement, particularly if no trace ingredients are permitted. Most others were capable of seeing the various sides of the argument and seemed to pick their preference almost at random because they thought either would tell them what they needed to know. They seemed to equate the issue with labels that currently say: "may contain peanuts" -- they said no one with an allergy would take the chance of eating these kinds of products but that it was largely an irrelevancy to most others. And in that analogy, "does not contain peanuts" would serve the same purpose, they said. In fact, they thought "may contain" might be slightly more helpful as an affirmative statement to those with concerns.

Federal Government Messaging

A number of messages proposed for use by federal departments responsible for various aspects of biotechnology were tested in these focus groups. Key findings were as follows:

1. Some of the government messages, particularly those that made reference to stewardship, were appealing to respondents. For those predisposed to support biotechnology generally, the stewardship messages tended to reassure them that government was executing its role adequately. Those who tend to hold mixed views and those who tend to oppose these technologies found that many of the stewardship-related messages were less appealing, sometimes because the words were not appropriate but more often because they needed to hear more detail in order to feel more comfortable about the government role. In general, people were interested in hearing more detail about the kinds of efforts being made to ensure that stewardship was being carried out appropriately. The expression of messages without reference to more detailed facts and figures is not likely to positively influence the views of those with mixed or negative views toward the technology.
2. Messages that focused on economic benefits tended not to raise strong interest among the focus group respondents. They simply were not viewed as being as important to the respondents as the messages relating to stewardship or citizen engagement.
3. References to dollar figures and commitments tend to generate as many questions as the information answers. First, many don't have reference points for dollar values (they don't know whether the amounts seem like a lot or a little). Second, oftentimes references to dollar values evoke questions about how well government spends or manages money. Careful consideration

should be given regarding how and when dollar figures are used to support messages.

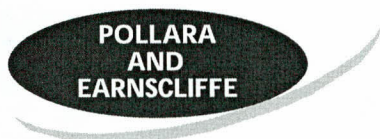
4. References to monitoring of long-term effects on health and the environment were the most widely noted of the messages tested. The idea of a "surveillance system" in particular was something that was attractive and appealing to many. However, the idea that Canada is only "working toward" these objectives often raised significant questions about how capable government is at keeping up with the evolution of these technologies.

Narrative "Storyline" Messaging

The other main aspect of communications testing in these focus groups involved two narrative "storylines," developed as templates for communications about the benefits of biotechnology. The first, unlocking "the mysteries of life," is a document that illustrates the kinds of benefits to society and to individuals that biotechnology might offer. The second, "Jobs and Growth," positions the economic benefits for Canada and Canadians. Based on the findings in the focus groups, the two documents have been revised and are attached as Appendices C and D to this report. In summary, the findings from the focus groups about these documents are as follows:

1. The "mysteries of life" storyline was generally much stronger than the "jobs and growth" storyline. The health and environmental benefits outlined in the mysteries of life document were focused on subjects that resonated much more strongly with Canadians. In particular, those predisposed to neutrality and/or opposition were much more likely to accept and acknowledge the benefits outlined in this document than they were for those in the jobs and growth piece.
2. The jobs and growth piece only really resonated with those who are already fairly strong supporters of biotechnology. Those opposed were often very likely to raise questions about who wrote the document (the assumption being that corporations or government staff who seek to help corporations wrote it) and whether the public's interests were being properly served by the distribution of the document. In short, the piece evoked a fairly high level of distrust, tempered by the discussion of safety and the mention of certain facts about Canada's position in terms of technological evolution (e.g. Canadian discoveries, the international profile of university programs associated with the field.)

3. Both of the storylines benefit significantly from references to the government's stewardship role. Many people, especially those predisposed to opposition to these technologies, felt that these messages did not receive a strong enough profile in either document – some felt that the fact they were placed at the bottom of the document implied that they were at the bottom of government's priority list in this field.
4. The testing of these documents clarified a number of related issues about messaging generally and government messaging in particular on biotechnology:
 - Even the strongest benefits of biotechnology aren't able to catalyze higher levels of support without a clear linkage to government's stewardship function.
 - It is important that government messaging not "oversell" the benefits, by implying that the impacts will be universally positive, or by presuming that there will not be some side-effects or downsides.
 - It is also important that remedies mentioned as part of the government's stewardship function reflect a sense of active, diligent current focus, and continued focus in the long term.
 - As importantly, stewardship messages need to avoid assertions or inferences that the potential problems associated with these technologies have already been handled by government and that there is nothing to be concerned with. People simply do not accept these kinds of reassurances from government. Indeed, these kinds of reassurances often engender the opposite reaction from the one the messages are intended to achieve.



Appendix “A”

Interview Schedule

PERCENT

1. When you hear the word “biotechnology”, do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive	37
Neutral	44
Negative	14
Don't know.....	5

2. When you hear the word “life sciences,” do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive	48
Neutral	42
Negative	6
Don't know.....	4

3. When you hear the word “genomics,” do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive	12
Neutral	51
Negative	11
Don't know.....	26

4. Over the last three months, have you heard anything about stories or issues involving biotechnology?

Yes	57
No	42
Don't know	1

Biotechnology applies science to living things such as plants and animals in order to develop new products and processes. Biotechnology is sometimes referred to as life sciences, genomics or genetic modification.

5. Before today, had you ever talked about biotechnology with someone?

Yes 54
No 45
Don't know 0

6. Would you say you are very familiar, somewhat familiar, not very familiar, or not at all familiar with biotechnology?

Very familiar 6
Somewhat familiar 43
Not very familiar 33
Not at all familiar 18
Don't know 0

7. Is biotechnology a subject you are very interested in, fairly interested in, not very interested in, or not at all interested in?

Very interested 15
Fairly interested 49
Not too interested 25
Not at all interested 11
Don't know 0

8. In general, would you say you strongly support, somewhat support, somewhat oppose or strongly oppose the use of products and processes that involve biotechnology?

Strongly support 8
Somewhat support 51
Somewhat oppose 20
Strongly oppose 10
Don't know 11

9. Overall, from what you know, do you think the federal government is doing an excellent, good, fair or a poor job of handling its responsibilities in the area of biotechnology?

Excellent	1
Good	13
Fair	39
Poor	26
Don't know	20

10. Would you say you are very familiar, somewhat familiar, not very familiar, or not at all familiar with ways in which biotechnology is regulated in Canada?

Very familiar	2
Somewhat familiar	21
Not very familiar	43
Not at all familiar	32
Don't know	3

11. Once a product that is developed using biotechnology (for example a health product like a drug or a type of food like corn modified to resist disease) has been evaluated and approved by the federal government, how confident are you about the safety of the product?

Very confident	14
Somewhat confident	48
Not very confident	26
Not at all confident	10
Don't know	1

12. In general, would you say that the regulatory system for biotechnology products in Canada is stronger, weaker, or about the same as it is in other countries?

Stronger	28
Weaker	18
About the same	32
Don't know	22

13. In the field of biotechnology, one role for the federal government is to regulate the products that are being developed, to ensure that they are safe for our health and environment; another role is to support the development of the industry, which helps create investment and jobs. With respect to biotechnology, which role do you think the federal government is putting more emphasis on today, or is it putting equal emphasis on both?

More on regulating products	16
More on supporting industry	25
Equal emphasis	41
Don't know	18

14. Which role do you think the federal government *should* put more emphasis on, or should it put equal emphasis on both?

Regulating products	43
Supporting industry	5
Equal emphasis	20
Don't know	2

15. Which of the following views is closest to your own?

Decisions about biotechnology should be based mainly on the views and advice of experts and scientists.....66

OR

Decisions about biotechnology should be based primarily on the views of average Canadians 27

Don't know 7

16. Which of these two views is closest to your own?

Decisions about biotechnology should be based mainly on the moral and ethical issues involved..... 36

OR

Decisions about biotechnology should be based mainly on the scientific evidence of risk and benefit. 56

Don't know 8

17ab

17. a. Which of these two views is closest to your own?

Genetically modified foods should meet the same testing standards that all other foods in Canada must meet 32

OR

Genetically modified foods should meet higher standards than other foods in Canada must meet. 66

Don't know 2

b. Which of these two views is closest to your own?

Genetically modified health products (like drugs) should meet the same testing standards that all other drugs in Canada must meet 45

OR

Genetically modified health products (like drugs) should meet higher standards than other drugs in Canada must meet. 52

Don't know 3

18. Which of these two views is closest to your own?

Federal government support for the Canadian biotechnology industry will likely enable Canadians to reap more benefits that biotechnology offers, faster 47

OR

Federal government support for the Canadian biotechnology industry will not necessarily have any impact on how **fast** Canadians reap the benefits that biotechnology offers. 42

Don't know 12

19. Which of these two views is closest to your own?

Genomics is a field of endeavour that I think Canada and Canadians should be leaders in, because it promises health and economic benefits 61

OR

Genomics is an area that Canada and Canadians should wait to see what others do, because it involves dealing with an issue that makes me uncomfortable. 31

Don't know 9

(a)

Please tell me if you strongly agree, agree, disagree or strongly disagree with each of the following statements.

- 20ab. a. Government should commit more resources to the regulatory system and the scientific research that supports it, to ensure the safety of biotechnology products on human health

Strongly agree.....	44
Agree.....	50
Disagree	4
Strongly disagree.....	1
Don't know	1

- b. Government should commit more resources to the regulatory system and the scientific research that supports it, to ensure the safety of biotechnology products on the environment

Strongly agree.....	38
Agree.....	56
Disagree	4
Strongly disagree.....	1
Don't know	1

21. Government should commit more resources to biotechnology research that can produce economic benefits and could lead to growth and job creation in this growing field

Strongly agree.....	21
Agree.....	60
Disagree	13
Strongly disagree.....	3
Don't know	3

22. Government should commit more resources to biotechnology research that can produce health and medical breakthroughs which will benefit Canadians

Strongly agree.....	32
Agree.....	57
Disagree	7
Strongly disagree.....	2
Don't know	2

(4)

23. a. In the same way as the information technology industry has provided economic growth and good jobs for Canadians, life science technologies have the potential to do the same for Canada in the years to come

Strongly agree19
Agree.....67
Disagree8
Strongly disagree.....1
Don't know5

- b. In the same way as the information technology industry has provided economic growth and good jobs for Canadians, the biotechnology industry has the potential to do the same for Canada in the years to come

Strongly agree16
Agree.....68
Disagree11
Strongly disagree.....1
Don't know4

24. a. The government should conduct further research into the long-term health impacts of biotechnology before allowing any further use of biotechnology

Strongly agree37
Agree.....48
Disagree14
Strongly disagree.....1
Don't know1

- b. The government should conduct further research into the long-term environmental impacts of biotechnology before allowing any further use of biotechnology

Strongly agree34
Agree.....49
Disagree12
Strongly disagree.....2
Don't know2

(4)

25. Government should commit more resources to biotechnology research to ensure that Canadian biotechnology researchers remain in Canada to do their scientific work, rather than moving to the United States or other countries

Strongly agree.....	35
Agree.....	50
Disagree	10
Strongly disagree.....	2
Don't know	2

26ab

26. a. Government should encourage the development of biotechnology, although there may be some unknown risks to human health

Strongly agree.....	9
Agree.....	44
Disagree	34
Strongly disagree.....	11
Don't know	2

- b. Government should not encourage the development of biotechnology, because there may be some unknown long-term risks to human health

Strongly agree.....	9
Agree.....	28
Disagree	50
Strongly disagree.....	11
Don't know	3

27ab

27. a. We have to accept some risk to achieve the benefits of biotechnology like new discoveries that improve the diagnosis and cure of serious illnesses

Strongly agree.....	20
Agree.....	55
Disagree	17
Strongly disagree.....	4
Don't know.....	3

4

b. We have to accept some risk to achieve the benefits of biotechnology like new foods that contain vitamins or medicine

Strongly agree.....	10
Agree.....	51
Disagree	28
Strongly disagree.....	10
Don't know	2

28ab

28. a. From what I know, genetically modified food presents me with few benefits over non-genetically modified food, but it presents many more risks

Strongly agree.....	16
Agree.....	40
Disagree	31
Strongly disagree.....	4
Don't know	9

b. From what I know, genetically modified health products (like drugs) provide me with few benefits over non-genetically modified health products (like drugs), but they provide many more risks

Strongly agree.....	10
Agree.....	38
Disagree	33
Strongly disagree.....	6
Don't know	13

29ab

29. a. If the best available scientific evidence says that a particular use of biotechnology is safe, it should be allowed

Strongly agree.....	16
Agree.....	65
Disagree	15
Strongly disagree.....	2
Don't know	3

(4)

b. We have to accept some risk to achieve health benefits from biotechnology research

Strongly agree.....	8
Agree.....	51
Disagree	30
Strongly disagree.....	10
Don't know	1

30. Although there may be some unknown risks, technologies like biotechnology are part of the future, so all we can do is make sure that its uses are as safe as possible

Strongly agree.....	28
Agree.....	58
Disagree	10
Strongly disagree.....	3
Don't know	1

31ab

31. a. Government assistance to the information technology industry in the early stages of its development helped it to become a world leader, providing jobs and economic growth to Canada

Strongly agree.....	13
Agree.....	63
Disagree	13
Strongly disagree.....	2
Don't know	10

b. Government assistance to the biotechnology industry would help it become a world leader, providing jobs and economic growth to Canada in the same way it helped the information technology industry develop in the 1980s and 90s

Strongly agree.....	14
Agree.....	65
Disagree	15
Strongly disagree.....	2
Don't know	4

(4)

32. a. Until more is known about the risks, government should slow the use of biotechnology

Strongly agree.....23
Agree.....45
Disagree.....27
Strongly disagree.....3
Don't know.....2

b. Government should not encourage the development of biotechnology, because there may be some unknown risks

Strongly agree.....8
Agree.....24
Disagree.....55
Strongly disagree.....11
Don't know.....2

33. a. If I knew that ongoing long-term safety research was going to be conducted on biotechnology products after they were approved for sale in Canada, it would make me feel comfortable enough to accept these products

Strongly agree.....17
Agree.....60
Disagree.....15
Strongly disagree.....6
Don't know.....1

b. Even if I knew that ongoing long-term safety research was going to be conducted on biotechnology products after they were approved for sale in Canada, it would not make me comfortable enough to accept these products

Strongly agree.....11
Agree.....36
Disagree.....45
Strongly disagree.....6
Don't know.....3

(4)

34ab

34. a. When I see a food product on a store shelf, I assume that it must be safe	
Strongly agree.....	23
Agree.....	48
Disagree	21
Strongly disagree.....	7
Don't know	1

b. I frequently worry about whether food products on store shelves are safe	
Strongly agree.....	25
Agree.....	35
Disagree	32
Strongly disagree.....	8
Don't know	0

35. The primary function of the federal government in the field of biotechnology is to understand and manage the risks while working to gain the benefits	
Strongly agree.....	29
Agree.....	57
Disagree	9
Strongly disagree.....	2
Don't know	3

I would like to read you some statements in favour of biotechnology. In each case, please tell me whether the statement is a very good argument in favour of biotechnology, a good argument, or not a very good argument.

36. The mapping of the human genome unlocks the mysteries of life, and will enable humans to identify the causes of disease and develop the cures that were once thought unreachable	
Very good argument	39
Good argument	49
Not a very good argument	9
Don't know	3

(4)

37. Biotechnology research represents the next frontier of human endeavour, a frontier that will lead to significant quality of life benefits for all Canadians

Very good argument	22
Good argument	55
Not a very good argument	20
Don't know	2

38. Scientific research in the area of biotechnology will enable Canada's next generation to get well paid, knowledge-based jobs and develop skills that will ensure them a bright economic future

Very good argument	20
Good argument	49
Not a very good argument	29
Don't know	2

39. Biotechnology is being targeted by most industrialized countries as one of the most important sources of jobs and economic growth in the 21st century

Very good argument	15
Good argument	49
Not a very good argument	30
Don't know	5

40. Biotechnology applications in the environmental field will create new types of products that will help us solve environmental problems that affect our air and our water

Very good argument	28
Good argument	54
Not a very good argument	15
Don't know	2

(4)

41. a. There is fierce international competition in the area of biotechnology research, and if Canada does not move ahead quickly in this field, it will fall behind other nations and may not reap its *economic and employment benefits*

Very good argument 24
Good argument 45
Not a very good argument 29
Don't know 2

- b. There is fierce international competition in the area of biotechnology research, and if Canada does not move ahead quickly in this field, it will fall behind other nations and may not reap *its health and medical benefits*

Very good argument 23
Good argument 45
Not a very good argument 31
Don't know 2

I would like to read you some statements *against* biotechnology. In each case, please tell me whether the statement is a very good argument *against* biotechnology, a good argument, or not a very good argument.

42. Pests may develop resistance to new pest-resistant genes in certain genetically modified plants, which could make them stronger and more able to attack other plants

Very good argument against..... 25
Good argument against..... 51
Not a very good argument against 20
Don't know 4

43. Herbicide-resistant crops can transfer those properties to its weed relatives, creating a stronger "superweed" that can out-compete native species and destroy natural ecosystems

Very good argument against..... 30
Good argument against..... 44
Not a very good argument against 22
Don't know 5

44. While some biotechnology research sounds interesting, all it takes is one scientist to make one mistake for a major environmental or health accident to occur

Very good argument against.....	28
Good argument against.....	36
Not a very good argument against	35
Don't know	1

45. Genetically modified crops may contaminate neighbouring organic and non-GM fields

Very good argument against.....	24
Good argument against.....	46
Not a very good argument against	25
Don't know	5

I would like to read you some statements regarding government's role in the area of biotechnology. In each case, please tell me whether the statement has a positive impact or a negative impact on your view of the government role in this area, using a scale of 1-5, with 1 being a very negative impact, 5 being a very positive impact, and 3 being no impact.

46. a. The Government of Canada is fully committed to realizing the benefits of genomics for all Canadians

1 Very negative	8
2.....	11
3 No impact.....	34
4.....	21
5 Very positive	23
Don't know	3

b. The Government of Canada is fully committed to realizing the benefits of genomics for all Canadians while ensuring that it has an effective, comprehensive regulatory and scientific infrastructure to ensure that the products are safe

1 Very negative	8
2.....	6
3 No impact.....	25
4.....	24
5 Very positive	33
Don't know	3

77ab

47. a. Biotechnology-derived foods go through a stringent safety assessment process run by the government that is recognized as one of the best in the world. It typically takes between seven and ten years for the development, assessment, and approval of biotechnology-derived products

1 Very negative	8
2.....	7
3 No impact.....	24
4.....	26
5 Very positive	33
Don't know	3

b. Biotechnology-derived health products go through a stringent safety assessment process run by the federal government that is recognized as one of the best in the world. It typically takes between seven and ten years for the development, assessment, and approval of biotechnology-derived products

1 Very negative	6
2.....	6
3 No impact.....	27
4.....	25
5 Very positive	34
Don't know	3

3

48. The Government of Canada is committed to ensuring that its science and regulatory system for biotechnology is strong. To that end, it has committed \$90 million additional dollars to enhance the regulatory system for biotechnology products

1 Very negative	7
2.....	8
3 No impact.....	26
4.....	27
5 Very positive	29
Don't know	3

49. Canada has established a commission of leaders in science, industry and academia to consult with Canadians about biotechnology and provide recommendations to the government about how to ensure that Canada reaps the benefits that it offers while managing the risks that it presents

1 Very negative	6
2.....	8
3 No impact.....	30
4.....	26
5 Very positive	27
Don't know	3

50. Canada is a world leader in its regulatory system for biotechnology products, using rigorous scientific research, and comprehensive and transparent rules

1 Very negative	7
2.....	8
3 No impact.....	35
4.....	22
5 Very positive	23
Don't know	5

51. Fields of research like life sciences and biotechnology are built on the foundation of publicly supported scientific research, and that is why the Government of Canada has made a commitment to support research in these fields

1 Very negative	5
2	7
3 No impact.....	33
4	28
5 Very positive	25
Don't know	2

52. The government is committed to maintaining the strength of the regulatory system, by keeping pace with changes in technology and using the best science available to evaluate the safety of biotechnology products

1 Very negative	6
2	7
3 No impact.....	25
4	26
5 Very positive	34
Don't know	3

53. a. Health Canada is working to establish a national surveillance system to monitor long-term human health effects of biotechnology products in Canada

1 Very negative	6
2	7
3 No impact.....	24
4	26
5 Very positive	35
Don't know	3

3

b. Environment Canada is working to establish a national program to monitor long-term environmental effects of biotechnology products in Canada

1 Very negative	5
2.....	5
3 No impact.....	26
4.....	25
5 Very positive	36
Don't know	4

54. In general, would you say you personally are very comfortable, somewhat comfortable, somewhat uncomfortable, or very uncomfortable with the idea of buying foods that contain genetically modified ingredients?

Very comfortable	14
Somewhat comfortable.....	37
Somewhat uncomfortable	28
Very uncomfortable.....	19
Don't know	1

55. About two-thirds of processed foods contain genetically modified ingredients or come from plants that have been genetically modified. Some people say that knowing this makes them more uncomfortable about these foods, because it means they are being widely used and may pose risks. Others say that knowing this makes them more comfortable about genetically modified foods, because it suggests that genetically modified ingredients are not harming health if they are that widely used and we haven't heard of any safety problems thus far. Which of these two points of view is closest to your own?

More uncomfortable, pose risks	47
More comfortable, not harming health	49
Don't know	3

3

56. If you were to find out that a food product that you have purchased in the past contained "genetically modified" ingredients, would you: continue to buy it, buy it but plan to find out more, not buy it until you found out more, or never buy it again?

Continue to buy it..... 30
Buy it but plan to find out more 31
Not buy it until you found out more 27
Never buy it again..... 11
Don't know 1

57. Last month, a report on biotechnology by the Royal Society tabled a series of proposals and recommendations regarding its regulation in Canada. Are you aware or unaware that this report was tabled?

Aware 6
Unaware 93
Don't know 1

58. (AMONG THOSE AWARE) Would you say you are very familiar, somewhat familiar, not very familiar or not at all familiar with this report and its contents?

Very familiar 14
Somewhat familiar 36
Not very familiar..... 42
Not at all familiar 8

(3)

Appendix "B"

Moderator's Guide

Introduction and Warm-up (5 min)

- The moderator will take a few minutes to go around the table and ask respondents to introduce themselves, and outline a few ground rules: want to ensure that people share their views openly, let everyone participate, want people to talk about their views, not "other people's views," ensure that we don't want people to "debate" each other – everyone's views are valid, there are no right or wrong answers
- The moderator will also point out that there is a one-way mirror, observers in the back, and audio and video taping, but ensure that all discussion is confidential

General Impressions (15 min)

- 1a → c
- I'm going to say a word to you, and after I say it, I want you to write down the first thoughts that come to mind right away, and whether the word/phrase has a negative connotation, a positive connotation, or no connotation (you have not heard of it before).

1a Biotechnology

1b Life Sciences

1c Genomics

- 2ab
- (For each) Where did you develop these impressions? What does it encompass?

3a

Definition: Biotechnology applies science and engineering to living things like plants and animals to create new products and processes. It includes numerous applications, everything from cross-breeding plants to genetic testing to screen for inherited diseases. Biotechnology is sometimes referred to as life sciences, genomics, or genetic modification.

2ab

Applications (15 min)

- 3b
- Biotechnology has applications in a number of fields. Can you recall any that you have heard of?

- 4
- How often do you hear about biotechnology?

- 5a → c
- Are you interested in this subject? Is this a subject you follow closely in the news, or not? Compared to other issues, how closely do you follow issues related to biotechnology?

5b

5c

We would like to hear your response to various applications of biotechnology. For each of the following, please tell me if you feel that this type of application is more acceptable, or less

acceptable to you. For each: What are some of the risks associated with these products? What are some of the benefits? Why do you say that? (ROTATED FOR EACH GROUP)

- 4 6a → d
 - Implanting plant genes in other plants (like corn that has a gene from another plant inserted into it to resist certain kinds of insects), to help improve the quality/quantity/price of food
- 4 7a → d
 - Using genes from one organism to change another organism in order to help clean up environmental problems (bioremediation).
- 4 8a → d
 - Biomass products for energy, such as growing certain types of grains in very high yields to produce products like ethanol, a substitute for gasoline that is less harmful to the environment
- 4 9a → d
 - Helping to cure type 1 diabetes by inserting a gene into the pancreas that stimulates the insulin production process, enabling people to produce their necessary level of insulin on their own.
- 4 10a → d
 - Had you heard of a report about this subject released by the Royal Society of Canada last month? Can you recall any of the contents of that report? Was the report positive or negative toward biotechnology? Was it positive or negative toward the government role?

Perceptions - Roles and Responsibilities of the Federal Government (15 min)

- 4 11a → d
 - How do these biotechnology products (examples: food/health/environment) become available in Canada? Do you know if we have laws or rules that govern products made through biotechnology? What government departments might be responsible? How effective do you think these systems are?
- 12ab
 - From what you know, what are the responsibilities of the federal government in the area of biotechnology? (PROBE REGULATION/SCIENCE/SUPPORT TO INDUSTRY)
 - The federal government is committed to actively promote biotechnology, a knowledge-intensive sector that promises significant benefits to Canadians in medicines and health, the environment and agriculture. It is also committed to regulating the development of biotechnology and its products, to ensure they are safe, that the risks are understood and managed and that the science is performed to provide answers to the questions about risk and safety.
- 13ab
 - From what you know, how effective would you say the government is at carrying out each of these roles? Why do you say that?
- 14
 - Can government regulate industry and support industries like this at the same time? If yes, how?
- 15a → c
 - Do you think government spends too much/too little resources to evaluate science and regulate biotechnology products? Were you aware or unaware that the government recently dedicated 90 million new dollars to this type of research? Does this sound like a lot/a little to you?

- 16ab • How do safety standards for biotechnology products in Canada measure against other countries? Why do you think that? -16b
- 17ab • From your perspective, what is the best reason for government to support the development of the biotechnology industry? What is the best reason why it should not? -17b

Federal Government Messaging (15 min)

test elements
of messages
18a → c
(9)

Having had this discussion, you should know that the Government of Canada has recently taken a number of steps to address issues associated with biotechnology. Some of government's policies and approaches to these issues are outlined on the handout I am passing out now. What I would like you to do is for each, indicate whether it makes you feel much more comfortable about government's role in this field, somewhat more comfortable, or no more or less comfortable. After you have done so, I would like to discuss the results with you.

18a The Government of Canada is fully committed to realizing the benefits of biotechnology/life sciences/genomics for all Canadians while ensuring that it has an effective, comprehensive regulatory and scientific infrastructure to ensure that the products are safe

18b Biotechnology-derived foods go through a stringent safety assessment process run by the government that is recognized as one of the best in the world. It typically takes between seven and ten years for the development, assessment, and approval of biotechnology-derived products

18c The Government of Canada is committed to ensuring that its science and regulatory system for biotechnology is strong. To that end, it has committed 90 million additional dollars to enhance the regulatory system for biotechnology products.

18d Canada has established a commission of leaders in science, industry and academia to consult with Canadians about biotechnology and provide recommendations to the government about how to ensure that Canada reaps the benefits that it offers while managing the risks that it presents

18e Canada is a world leader in its regulatory system for biotechnology products, using rigorous scientific research, and comprehensive and transparent rules

18f Fields of research like life sciences and biotechnology are built on the foundation of publicly supported scientific research, and that is why the Government of Canada has made a commitment to support research in these fields

18g The government is committed to maintaining the strength of the regulatory system, by keeping pace with changes in technology and using the best science available to evaluate the safety of biotechnology products

18h Health Canada is working to establish a national surveillance system to monitor long-term human health effects of biotechnology products in Canada

186

Environment Canada is working to establish a national program to monitor long-term environmental effects of biotechnology products in Canada

DISCUSSION

Innovation (15 min)

- The Government of Canada is following an economic plan that it calls an "Innovation Agenda." It says that in order for a country to succeed in the New Economy it must invest in research and knowledge creation to be able to create new products and services to sell to the world. To do so, it must have a highly educated work force and new technologies for those people to understand and use. Those technologies can help us be more efficient and competitive in traditional areas or excel in all the new information-based areas like telecommunications and computerization. According to this plan, the more a country can spend on research, the more a country can invent, the more productive it is, the larger its skilled and educated work force, the more successful it will be. The logic says that innovation leads to higher efficiency and productivity which, in turn, lead to more jobs which are better and more high paying and higher economic growth.

19

Does this sound like it makes sense?

20

Is it a priority worth following for the Government of Canada?

21ab

- How important is it that government play a role in fostering the development of new technology industries? Do you think that they will emerge in Canada anyway, or do you think that government support can encourage that process?

22

- Some people have said that government support to the information technology industry was instrumental in facilitating its development and the jobs that it now provides to many young people. Others say that it would have happened regardless of whether government played a role. What do you think?

23

- Do you think there should be the same kind of priority given to biotechnology/life sciences (alternate for each group)?

24

- Do you think there might be the same kind of results in the case of biotechnology/life sciences (alternate for each group)?

25

- What would you say are the top 1 or 2 priorities the federal government should pursue in the field of biotechnology going forward?

GM Foods (10 min)

- From what you know, is all the food that gets to the grocery store tested for safety? How, when, by whom? From what you know, is the system effective?

26a → c

26b

26c

- 27ab. How do you generally feel about GM foods? Do you have strong views one way or the other? 27a 27b
- 28ab. What proportion of the ingredients in processed foods might contain genetically modified ingredients? After responses: It is estimated that more than 65% of the processed food in Canada contains GM ingredients or comes from plants that have been genetically modified. Does that surprise you? 28a 28b
- 29ab. From what you know, what is the main benefit of GM food? What is the main drawback? 29a 29b
- 30ab. Did you know that the newest GM foods promise to provide nutritional/medicinal benefits (enhanced levels of vitamins and minerals?) How does knowing that make you feel about these products? 30a 30b
- 31ab. Do you feel that governments are doing enough to ensure your safety when it comes to GM foods? What could they do to reassure you? 31a 31b

Labeling (15 min)

- Labeling food in relation to genetic modification is something that is currently being considered by governments as well as some of the companies that produce these products. As you may realize, labeling is not quite as straightforward as one might think.

First of all, I want to give you some of the arguments for and against labeling genetically modified foods and see what you think.

First, it is important to understand that right now in Canada all foods **MUST** be labeled to address aspects of food safety. For instance, nutritional changes, compositional changes and the presence of allergens must be labeled.

The reason foods with genetically modified ingredients are not labeled now is that they have been approved for sale because the government says they are safe and equivalent to similar foods without genetically modified ingredients. For instance, corn tortilla chips might include ingredients made from GM corn or corn that has not been modified. The corn looks and tastes the same in either case.

Some people want systematic labeling of GM foods. Some do not.

Everybody agrees to do so means substantial changes in our food production system. For instance, for the labels to be meaningful, what they claim must be capable of being verified. That means products like grain would have to be segregated into GM grain and non-GM grain right at the farm level. They would have to be harvested, stored and transported separately. Companies that produce processed foods would need separate lines for GM and non-GM or get out of one of the products altogether.

People who want systematic GM labeling say that current labeling for safety does not take into account social or ethical concerns or production methods. They say if GM products were labeled systematically, they would have the choice to consume GM foods, organic foods or others, whatever the reason for their choices. They say they should have the option of non-

GM products in case GM foods turn out to be more dangerous than governments say they are now.

Those opposed say it would make food production significantly more expensive. They also say if you label the foods, people will automatically think they are unsafe and get upset. That would mean grocery stores would be frightened into not stocking GM foods and those who want them for their benefits would lose the opportunity to buy them.

There are also implications for world trade in food. Currently, some countries insist on labeling; others do not. Canada's products, for instance, cannot be sold in some countries because they are genetically modified or because we cannot certify that they are not. In this case, segregating our products and labeling them would allow us to sell in these countries. However, because there are no international rules about this, if we insist on mandatory labeling, we might be breaking our existing trade agreements with countries that do not label, like the U.S. Lastly, to insist on systematic labeling, segregating and tracking products is to impose significant costs on developing countries who are using biotechnology to grow more and harder crops. They may lose their opportunity to sell agricultural products.

32ab As I said, this is complicated. After hearing all that – what do you think about labeling GM foods? Are you in favour or opposed or don't really care? 32b

33 If systematic labeling increased the cost of processed food by 10%, as some studies have suggested, does that alter your view in any way?

- Let's assume the government goes ahead with labeling for GM foods. There are many ways to label these kinds of foods. I'm going to provide you with some options for labeling of these products, and for each, I'd like you to write down what the benefits and drawbacks are that you would see, whether the information that would be provided might be helpful and then which of the three you as a consumer would prefer.

Option #1 -- Labeling the Process

Genetic modification includes processes like crossbreeding flowers or trying to reproduce mutations that have occurred in plants and animals. It also involves processes like trying to create beneficial mutations through things like radiation. The newest technique is to modify actual genetic structures.

The label could be used quite broadly. In other words, any food created using any of those processes would be identified as having been produced using GM techniques.

Or

The label could be used very narrowly. GM labeling would not be used to identify anything but the newest technique, that is, using modern technology to alter DNA in genes.

Which do you think might be more appropriate?

Option #2 – Labeling the Ingredients

A food could be non-GM even if there was a very small agreed-upon amount of GM ingredients. Allowing trace amounts would make segregation of products much easier.

Or

A food could be non-GM only if there were absolutely no GM ingredients in it.

35 Which do you think might be more appropriate?

Option #3 – Labeling Presence or Absence

The label would say the product might contain some GM ingredients. In this case, two-thirds of processed foods might carry the label. There probably would not be enough room to list the actual ingredients but there might be a line telling you where you might find that information.

OR

The label would say the food was GM ingredient free or Non-GM. If a product did not carry this label, the purchaser would have to assume there might be GM ingredients in it. Given the number of processed foods with GM ingredients, this option might mean consumers would have to look at a number of products to find out which were GM free.

36 Which do you think might be more appropriate?

Communications Material Testing (15 min)

MATERIALS – TWO-PAGE “NARRATIVES” ON BIOTECHNOLOGY
(See Appendices C and D)

I am going to provide you with some materials that describe some aspect of biotechnology and its potential impact. What I would like you to do is read each of them, and after we read each one, I'd like to discuss each with you. (ROTATE THE TWO PAGERS)

Please circle or underline the parts or sections that strike you as interesting or appeal to you.

- 37 1. When you read it, does it make sense to you?
- 38 2. What are the one or two main messages that it delivers?
- 39 3. Is it credible (or believable) to you, or not?
- 40 4. Does it provide you with information or a message that you have/have not heard about this subject?
- 41 5. Overall, does it represent a good reason to move ahead in the area of biotechnology, or not?

Appendix “C”

Narrative Storyline – “The Mysteries of Life”

We are just beginning to understand our genetic code, the language of life itself.

The sequencing of the human genetic code is one of humanity's greatest achievements and, at the same time, only the start of a journey to unlock the secrets of life. Just as the computer and telecommunications transformed our lives at the end of last century, the promise of biotechnology and genomics is to revolutionize the way we live our lives during the next.

Virtually every day of every week biotechnology researchers in hospitals, universities and laboratories around the globe discover something new and vitally important. Some of those discoveries herald almost inconceivable breakthroughs in the years to come. Some make them possible right now.

In the Canada of last century, Banting and Best first discovered insulin. Within decades biotechnology had created genetically modified human insulin that was safer for diabetes patients than the natural animal insulin used up to then. This year, in Alberta, biomedical researchers and physicians believe they have discovered what may be a cure for Type One diabetes by taking healthy genes and inserting them into the pancreas of a person with Type One.

Other examples of Canadian firsts in genetic research include the discovery of the genes responsible for cystic fibrosis and muscular dystrophy. Knowing the gene disorder that causes the disease brings us closer to creating the gene therapy to prevent it in the first place or cure it once it begins. In Montreal, a Canadian company is leading world efforts to use biotechnology to create a vaccine for cancer.

We are not alone in the race for knowledge and new discoveries along our journey to unlock the mysteries of life. Countries all over the world are deeply engaged in trying to gain the benefits of biotechnology and to build thriving biotechnology industries.

But the international community also understands that this is a newly emerging technology that involves the very core of life itself. With using that technology comes the responsibility of ensuring that the risks are fully understood and managed. Open discussion and public dialogue will become increasingly important as our society works its way through the associated social and ethical issues.

The Government of Canada is wholly committed to realizing the benefits of genomics and biotechnology for all Canadians while ensuring that it continues to have an efficient, effective regulatory system and the scientific capacity to protect health and the environment. It must strongly encourage the scientific research that will help us to

understand and manage the potential risks. In other words, the government understands that it must ensure that this revolutionary knowledge will be used wisely and for the benefit of all.

Unlocking the secrets of life through biotechnology will produce whole new ways to make our lives better and safer. Looking ahead, researchers believe they will likely include:

- curing unyielding diseases for which there are currently no cures;
- simplifying and adding certainty and speed to the prevention of illness and the diagnosis of disease;
- producing personalized medicines that are specifically designed for individuals so they are significantly more effective and have fewer side effects;
- using new industrial processes and technologies to clean up environment damage and to address problems such as global warming;
- developing ways to increase production in agriculture and aquaculture and improve the health of our forests while doing away with the need for harmful pesticides; and
- producing foods that will improve health all over the world because they would contain vaccines and vitamins that are not easily available or too expensive for many to buy.

Potential advances like these suggest that we should move ahead in trying to unlock the secrets of life and building our biotechnology capacity but that should only be done in measured, responsible and transparent ways.

Appendix “D”

Narrative Storyline – “Jobs and Growth”

Biotechnology promises to transform our lives in ways that were not considered possible before. As biotechnology researchers in hospitals, universities and laboratories around the globe begin to unlock the mysteries of life itself, they are making discoveries that are new and vitally important.

Current research efforts indicate that over time biotechnology may provide cures for unyielding diseases, as well as simplifying and adding certainty and speed to the prevention of illness and the diagnosis of disease. It may help us to use new industrial processes and technologies to clean up environment damage like the way pulp and paper industry is now using biotechnology to clean up its effluent. Biotechnology is developing ways to increase production in agriculture and to create new foods --- for instance, canola is a product of biotechnology developed in Canada and sold around the world. Canadian biotechnology researchers are developing fast-growing, high yield grains to be turned into ethanol to reduce fuel emissions.

Countries and companies all over the world believe that biotechnology will have the impact this century that computers and telecommunications had in the last. It will alter the way we live our lives and create whole new classes of products, processes and highly skilled, highly paid jobs that will go with them. Just as current generations are now involved in exciting information and communication technology research and applications, many in the next generation of children and students will have similar opportunity in biotechnology and all of its associated fields like genomics, bio-medicine, bio-informatics, proteomics and bio-environmental restoration.

Biotechnology is being targeted by most industrialized countries as one of the most important sources of jobs and economic growth in the 21st Century. The global market for biotechnology products is expanding at an unprecedented rate. There are estimates that world trade in biotechnology will be about \$50 billion within four years, growing fully ten per cent a year.

But the international community also understands that this is a newly emerging technology that involves the very core of life itself. With using that technology comes the responsibility of ensuring that the risks are fully understood and managed. Open discussion and public dialogue will become increasingly important as our society works its way through the associated social and ethical issues.

The Government of Canada is committed to realizing the benefits of genomics and biotechnology for all Canadians while ensuring that it continues to have an efficient, effective regulatory system and the scientific capacity to protect health and the environment. The government understands that it must ensure that this revolutionary knowledge will be used wisely and for the benefit of all.

In Canada, efforts to encourage biotechnology products and applications are part of a determined effort to create an economy based on innovation. As Canadians become more innovative, we will be better able to take advantage of the opportunities around the world for knowledge-intensive products and services—such as those related to biotechnology—and capture a greater share of the global benefits associated with innovation.

Canada is well positioned to do just that.

We are second in the world in terms of the number of biotechnology companies. Montreal hosts the largest specialized biotech research centre in the world and Toronto's medical research output is second only to that of Harvard University.

Canadian biotechnology researchers believe they have discovered a cure for Type One diabetes honouring the original discovery of insulin by Canadian doctors Banting and Best. Canadians have found the genes for cystic fibrosis and muscular dystrophy, opening the way for potential gene therapies to prevent and cured those diseases. In Montreal, a Canadian company is among the world leaders in biotechnology research trying to find a vaccine for cancer.

A new field called bio-informatics combines biotechnology research with information technology. For instance, by some estimates, we will need a thousand-fold increase in computer power to understand all the complexities of the human genome alone. Canada is a world leader in both medical research and information and communications technologies. Our universities are home to 8 of the top 20 electrical engineering programs in North America and 7 of the top 20 computer schools.

We can expect that biotechnology's contribution to Canada's innovative capacity will only continue to grow in the coming years. Firms specializing in biotechnology products are spending close to 45 percent of their revenue on R&D, underscoring the continuing focus on making discoveries and generating new ideas. A 1998 survey shows that universities across Canada have already managed to create close to 100 biotechnology companies in Canada. Between 1996 and 1999, as many as 20 new biotechnology companies have emerged from the National Research Council alone.

We are not alone in the race for knowledge and new discoveries along our journey to unlock the mysteries of life. Countries all over the world are deeply engaged in trying to gain the benefits of biotechnology and to build thriving biotechnology industries. Those who are at the forefront will also be those who gain the most. The Government of Canada is committed to ensuring that we are positioned to capture our share of the benefits. It is also committed to doing so in ways that are responsible, measured and transparent.