POLLARA AND EARNSCLIFFE

PUBLIC OPINION RESEARCH INTO BIOTECHNOLOGY ISSUES

THIRD WAVE

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

December 2000

POLLARA
AND
EARNSCLIFFE

Presented to the Biotechnology Assistant Deputy Minister Coordinating Committee, Government of Canada, by Pollara Research and Earnscliffe Research and Communications.

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

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Introduction

Earnscliffe Research and Communications is pleased to present this report on a public opinion research program conducted in the fall of 2000 for the Assistant Deputy Minister Coordinating Committee (BACC), Health Canada, Environment Canada and the Canadian Food Inspection Agency. This was the third wave of a series begun in the fall of 1999. This wave was comprised of a variety of separate instruments:

- two telephone surveys, one primarily an instrument to track opinion on biotechnology, one to focus on regulatory and science issues;
- two sets of focus groups designed to support the surveys; and
- a secondary analysis of other public domain public opinion research published in the year between fall 1999 and fall 2000.

The research was split into two discrete surveys to ensure that questionnaires were of a manageable length and that discrete sections were rich enough to produce robust findings. To ensure comparability, the two instruments began in exactly the same way while some questions were repeated in both to see if attitudes remained consistent. To allow for easier synthesis and consumption, this report presents the findings of all the various instruments.

The research was designed to accomplish two major objectives:

1. • to track sentiment on a range of biotechnology issues, using a baseline of data developed in previous waves of research; and
2. • to assess public opinion in discrete areas of concentration in aid of developing policy and communications strategies.

The research probed a number of areas of investigation in order to develop a 3. 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, preferred roles for government and future priorities;
- knowledge of and attitudes towards regulatory and science issues;
- the acceptability of various products and processes;
- the acceptability of patenting various products and processes;

- attitudes on high-profile and emerging issues like genetically modified foods and genetic privacy;
- public demand for information and consultation; and
- the testing of communications issues like key messaging, intervenor credibility and appropriate spokesperson models.

The telephone work began on September 15, 2000 for both surveys, ending on October 1 for the science/regulatory instrument and October 10, 2000 for the tracking survey. The tracking survey, commissioned by the BACC, reports on the views of a random sample of 1512 Canadians and carries a margin of error for the national sample of +/- 2.6%, nineteen times out of twenty. The survey measuring regulatory and scientific issues, commissioned by Health Canada, Environment Canada, the Canadian Food Inspection Agency and the BACC, reached a random sample of 1202 Canadians and carries a margin of error of +/- 2.9%. Margins of error for sub-samples would be larger. Precise margins of error can be provided for the variety of aggregated sub-samples.

Ten nights of focus groups (twenty groups in all) were conducted in two waves because of a suspension of public opinion research during the fall federal election period. The first four nights were held in Montreal, Toronto, Vancouver and Halifax between October 15, 2000 and October 24, 2000. The second wave of groups was conducted in St. John's, Quebec, Toronto, Brandon, Calgary, and Victoria between December 10 and December 20, 2000.

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

The secondary analysis involved a search of publicly available research reports in biotechnology and builds on our previous secondary analysis work for the BACC. It is designed to summarize the broad areas of consistency, and areas of divergence, among public domain research reports.

This report consists of several sections, including an overview of all segments of the research and detailed reports on each. The initial summary section and the following section outlining detailed findings integrate results from the telephone surveys and the focus groups. Following those sections are the report on the secondary research, the questionnaire for the telephone surveys with national

results expressed in percentages and the moderator's guides used in the focus groups. We have provided detailed cross tabulations of the questionnaire responses to the Canadian Biotechnology Secretariat but have not included them in this report because of space limitations. They are available upon request.

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Executive Summary

Awareness, Familiarity and Interest Levels

Biotechnology is no longer an obscure subject for most Canadians. Increasing numbers report hearing and talking about biotechnology though there still are very low levels of familiarity, interest or intellectual engagement in the issue. Most find the area too complex and technical to follow closely. In addition, though most express concern about potential risk, they are both resigned to the inevitability of risk and confident that somewhere, someone is in charge of trying to mitigate that risk. In a world replete with threats and risks, biotech-related risks seem to many to be less urgent and commanding of immediate attention. In general, Canadians seem to have assumed a casually watchful and mostly neutral stance.

Canadians have noticed increasing volumes of media coverage and that has broadened awareness levels – Involved Canadian respondents in most groups can cite specific articles and news stories that they have recently read or viewed on this issue. However, most people have divorced their personal assessments of biotechnology from the perceived media analysis.

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

A significant majority of Canadians continues to remain neutral to positive about biotechnology. A majority expresses direct support but does so with little intensity. There is a bit of "polarization" of attitudes emerging at the extremes where a small, entrenched minority remains strongly negative and where there has been some growth in the number of respondents who hold strongly favourable views. On the whole, however, there are higher levels of uncertainty and mixed feelings towards biotechnology in the fall of 2000. A general summary would say that over the past year, views of the majority in the middle have become more moderate and more equivocal rather moving to outright support or opposition.

Most people associate biotechnology with health and medical benefits, or with GM food. Some also associate biotechnology with the stock market, and its potential as a growth industry. There remains virtually no awareness of forestry applications or environmental applications like bio-remediation.

As Canadians become more aware of biotechnology, they are less willing to make blanket assessments (either positive or negative.) Views become more nuanced, and often come with qualifications. However, higher levels of awareness do not necessarily correlate with higher levels of concern or negativity toward biotechnology. In discussion, it frequently becomes evident that most people are torn in their views toward biotechnology.

Different language evokes profoundly different attitudes. *Genetic modification* has an almost universally negative connotation. It tends to be viewed fairly narrowly, linked most directly to ideas of eugenics and the manipulation of human genes. In contrast, *biotechnology* is a term that is broader, more inclusive of a range of applications, and generally connotes positive attributes.

Biotechnology Applications

Canadians continue to resist offering systemic views on biotechnology applications. They evaluate each application on its merits, bringing a core analytical framework to bear 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.

As has been found in both previous waves, health and medical applications are the most positively received and the strongest positive drivers for biotechnology. Environmental applications come next. Conversely, 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 resistance. Human gene modification is the most difficult concept for most people and requires the largest set of expressed benefits to render it barely acceptable.

Environmental applications are virtually unknown. It is clear people are receptive to the benefits case for environmental applications, particularly 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.

Ultimately, when it comes to applications, the purpose/outcome is the key positive driver, while the process is the key negative driver.

Federal Government Performance, Priorities and Roles

There has been a weakening in the public assessment of the federal government's performance in biotechnology. Fewer people are willing to give the government excellent or good ratings this fall and those numbers have been eroding steadily over the past year. However, the erosion in public assessment is linked to a general malaise with government and the uncertainty over biotechnology itself. There is virtually no understanding or knowledge of the government's biotechnology policy or regulations. Although few can say whether the federal government is doing an effective job, the first instinct of most is that it might not be. In part that is due to concerns that government cutbacks have eroded the effectiveness of the regulatory system.

For the most part, top-of-mind impressions are that the federal government probably has some regulatory role in the field of biotechnology, but virtually no one has any detailed sense of what that role might be. However, there are much stronger views about what the government roles *should* be. Most believe that the government must regulate aggressively to ensure product safety and that it should find the appropriate balance among competing demands and interests so Canada can reap the benefits of biotechnology. As well, Canadians emphasize health and environmental stewardship with a strong focus as well on research into the long-term health and environmental impacts of biotechnology. These views are based on a prevailing view that these technologies are moving forward without any sense that the risks are being considered, let alone managed by the federal government. 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. 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 much less important than health and safety regulations and research.

Nevertheless, and in many cases despite all of the foregoing, 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.

In summary, there was continuing broad support for a two-track policy approach, including a strong regulatory and scientific oversight system in addition to fostering the development of the technology and the industry. Specifically, a majority of Canadians believes in both functions (stewardship and promotion) for government and that they can be carried out in an appropriate and balanced way.

Managing Risk

The evaluation of risk and the risk/benefit ratio is a fundamental issue in public attitudes towards biotechnology. It affects the acceptability of all biotechnology applications. Underlying the demand for an increased emphasis on stewardship is the uncertainty people carry about biotechnology and its long-term risk.

Because of its importance, each research wave has probed the risk issue in a number of different ways 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.

Hard-line views on eliminating risk soften substantially when people have to trade off benefits and risks or are confronted with the potential loss of benefits. Most participants understand that the development and use of biotechnology applications carry risk, and are prepared to accept those risks in cases where the potential benefit merits taking a risk. They want biotechnology activity to proceed as long as government seems to be managing risk intelligently. Appropriate management of risk would appear to rest on putting into place strong regulation and long-term scientific inquiry.

In reality, most Canadians have resigned themselves to the fact that risk is pervasive in modern society and that managing risk is about as well as anyone can do. This acceptance of taking risk is more prevalent than found in previous waves of research. It is bound to a strong sense that progress cannot be achieved without calculated risks being taken.

The vast majority believe that science should be the primary guide to decision-making about biotechnology applications. Again, consistent with previous research, people do see biotechnology as having moral or ethical dimensions, but for the most part, health and environmental risks are the key drivers. Ultimately, if an application is deemed safe by the "best available" scientific research, most say that this is the best that we can expect.

Among the general public, the dominant view is that they themselves do not have the knowledge or ability to make effective decisions, and that experts (scientists, university researchers, government researchers and policy makers) are much better placed to make these kinds of decisions. Among Involved Canadians, there was a much stronger sense that individual Canadians should be involved in decisions. Where there was agreement among the two audiences was about the decision-making process – Canadians do not like the idea of decisions like this getting made "behind closed doors." Ultimately, for the majority of Involved Canadians, informed choice is the preferred option. That is, beyond safety, the government should make products available and allow individuals to make their own decisions about biotech products.

Regulation of Biotechnology

Canadians, by and large, are uncertain about Canada's biotechnology regulatory system but accept that the products it approves are safe.

It is clear they know very little about the way it works. A negligible proportion of Canadians claims strong familiarity with the regulatory system as a whole or with the way research is conducted into the safety of biotechnology products. The lack of familiarity drives down assessments of the federal government's regulatory performance and drives up demands for more regulation.

Nevertheless, despite the lack of knowledge and uncertainty, Canadians continue to presume things are working the way they should. Most express some level of confidence that federally approved products are safe. Those confidence levels also extend to the view that the Canadian regulatory system compares favourably with that of other countries.

Canadians feel confident in Health Canada's product safety approval processes. A majority also feel that food on grocery store shelves is safe. Virtually all focus group participants believed that the regulatory agencies, and scientists at Health

Canada in particular, are doing as well as can be expected given the current level of scientific knowledge of the risks, and the current level of resources dedicated to these purposes (which many feel is probably not adequate at this time).

The comfort level increases dramatically when the actual approval process is described. Three separate departmental approval processes were tested and all increased comfort levels substantially. When a brief overview of the regulatory approval processes for GM food and GM health products was provided to respondents, the majority were pleasantly surprised at the comprehensiveness of the actual regulatory approval processes, and were reassured by the information.

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 company research.

Most Canadians embrace international arrangements on biotech in the science and regulatory spheres and gain confidence once they know such arrangements are underway. Collaborative international arrangements convey a sense that the implied "pooled" resources are more capable of identifying risks. Canadians were willing to speed up approvals here to match quick approvals in the U.S. if that meant we could have access to products more quickly. However, as a matter of principle (and when the explicit benefit is removed from the question) most people say the approval process in other countries should have no bearing on the process or speed at which Canadian regulators work.

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Science and Credibility

To most Canadians, the acceptability and approval of biotechnology products and processes is largely a technical and scientific issue with relatively few significant moral or philosophical determinants. All three waves of research have produced the same results – for most, good science should be the main arbiter of regulatory approval. There are some important caveats:

- The proposed uses or outcomes have to be within a range of acceptability. Good science will not trump highly contentious applications that seem to fail the risk/benefit test.
- Biotechnology products have to meet higher scientific standards than non-biotech products.
- Long-term research into potential impacts is important to the credibility of the science.

In fact, the general willingness to move ahead in exploiting biotechnology increases substantially if people believe they have received scientific assurances of safety from credible sources.

There remains widespread distrust of a variety of institutions and potential spokespeople on all sides of the debate. There are few voices people would believe to be completely trustworthy in providing information about biotechnology.

The survey results suggest that scientists are highly credible voices on biotechnology – virtually all generate a reasonable level of credibility. Collaborative arrangements, international bodies and university-based science generate the most credibility.

Focus group discussions reveal another level of analysis. Most people rest their assessment of credibility on the degree to which the person or institution is perceived to be at arm's length and independent of controlling and/or funding influencers. The source of funding seems to be the critical test. As a result, many people say university scientists are much more credible than other scientists because it is assumed they are free from funding pressures and therefore, more "independent."

Similarly, government regulators maintain a relatively high degree of credibility because they have no financial stake in outcome and are presumed to be working in the public interest. Others that fall into that category are doctors and hospital researchers. Of note, participants felt that independent advisory boards (like the Canadian Biotechnology Advisory Committee) carry credibility as information sources on biotech. Most people were willing to accept the word of expert panels or advisory boards as long as they were clearly at arm's length from government and industry.

Lastly, credibility varies significantly among NGOs (non-governmental organizations) and interest groups. In general thesis, the less "political" and the less "self-interested," the higher the credibility.

Genetically Modified Food

The debate over the past year about genetically modified (GM) food has increased awareness and left more people personally uncomfortable about buying GM food. Consistent with previous waves of public opinion research, the GM food debate has not catalyzed opinion very deeply in most of the centres, although it continues to be of substantial concern in the lower mainland of British Columbia. The debate has not convinced most Canadians that GM foods are fundamentally risky or unsafe. The lack of a health incident or the production of convincing evidence to the contrary has left most people believing the food safety issue is more political than personally relevant. Only a small minority reject GM food under any condition or circumstance.

On a personal consumption level, however, there is a growing discomfort with GM food. About half of Canadians say they are uncomfortable buying GM foods and a significant number said they would stop purchasing for a while if they knew a food was GM. On the other hand, only a small percentage said they would never buy the food again. It is clear that opinions about GM foods remain in flux, partially because people tend to believe the food safety system is sound.

Most people advocate an "informed choice" approach to GM foods. As long as the science is sound, most people feel that the purchase of GM food should be up to each individual. Many accept voluntary labeling as a reasonable step. Others, primarily Involved Canadians, tend to lean toward mandatory labeling as a preferred solution.

The survey suggests that Canadians are ambivalent about GM food exports and do not believe that Canada has the right to insist that its products be accepted. Most people do not believe that impediments put in place by other countries are driven by trade considerations. Most people believe those countries have the right to, and actually do, make decisions based on their assessment of the potential risk.

There is little evidence that negative attitudes toward GM food inherently "spill over" and affect attitudes toward other types of GM applications. Most people conduct a case-by case assessment of each type of application, assessing them on their own individual merits. It should be noted, however, that among the core group of strong opposers of the technology, the same types of risk considerations are cited as reasons why other applications are opposed.

Patenting

A strong majority of Canadians sees more benefits than drawbacks to mapping the human genetic code. The results of this wave of research indicate higher levels of support for the idea of patenting genes than previous research has shown. Most people see more benefits than risks in allowing the patenting of genes and gene sequences. Very few of those who are troubled by patenting issues have moral or religious reservations – the objections are raised on the grounds of access and affordability. They tend to believe patenting drives up pricing and reduces accessibility. When it comes to health and medical products (the primary products people associate with genomic research and patenting), most tend to believe the overriding principle should be equality of access without financial obstacle.

When it came to the Harvard oncomouse (genetically modified for use in cancer research) and discussions of the patenting of higher life forms (e.g. plants and animals per se), the discomfort levels rose. Half of the survey respondents said they were not very or not at all comfortable with the Federal Court of Appeal decision granting the patent on the mouse.[1]

[1] The government sought leave to appeal the decision on October 2, 2000. The leave application is currently before the Supreme Court of Canada, with a decision expected in spring 2001.

For some, the concept of patenting a whole animal brings the issue into clearer perspective and offends at an emotional level. For others (significantly more), the issue puts the pricing of cancer cures squarely on the table.

The result of these underlying opinions is that most people believed the government was right to appeal the lower court ruling and that it was appropriate to begin consultations on the issue in order to have Parliament resolve it.

Genetic Privacy

The research yielded firm views despite the fact that most people had not actively considered the issue before. In general, there is overwhelming support for strong safeguards on genetic privacy, with the intended use of the information being the key determinant of any willingness to allow information to be sought and collected.

Most people say genetic information is different from other health information. Canadians fear that genetic information conveys too much power to people who obtain it and there is a fair consensus that government has a key role to play in ensuring genetic privacy. If these focus groups are any indication, genetic privacy may be one of the catalysts that drive public engagement on biotechnology.

There is very little patience for the proposition that employers or insurance companies have a right to genetic information to determine suitability for employment or insurability. That is seen as an unacceptable intrusion that exacerbates unbalanced power relationships.

When it comes to insurance, the vast majority of people believe that insurance pools and shares risk and provides a way to protect poor-risk individuals. As to the suggestion that non-disclosure would create a "moral hazard," most people grudgingly agreed that companies should be able to sue for fraud but *only* if the person had the actual disease/disorder when he/she applied for coverage not just the genetic predisposition.

More altruistic uses of genetic information are generally acceptable as long as there are commonsense safeguards in place. Most people believe there are substantial benefits to be gained from population genetic studies and that such studies are impossible without access to scientific data.

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Communications Issues

Messaging

Positive messaging around health and the environment is much stronger than positive messaging around economic benefits, food safety or regulatory strength. However, views have polarized to the extent that those who oppose biotechnology or are deeply uncertain will not believe or accept the positive messaging.

On the negative side, it is the argumentation about upsetting the ecosystem balance that is resonant, especially the ability of certain pests to grow stronger (or be eliminated altogether) as a result of pest resistance modified into trees and crops.

The negative messaging tested (current argumentation used by anti-biotechnology groups) is more powerful than previous negative arguments, which tended to be thin on specifics. However, the positive messaging surrounding health and environmental benefits is stronger. This kind of messaging taps into people's underlying sense that biotechnology may provide society with incredible medical breakthroughs.

On GM food applications, there remains virtually no way to create positive messaging around them. There is only the prospect of trying to convince people that the safety system they have passed is stringent, and that ongoing research will continue to be done on these products.

Involvement

Most Canadians would not want to participate in decision making or consultation sessions about biotechnology but they want to know they are being conducted and that people of sufficient expertise are attending. Generally, they believe more expert people would participate and that was all to the good. Most members of the general public are content to allow experts to sort through the issues as long as they can find out what happened and have access to information if they require it.

However, as indicated earlier, individual choice is still a powerful driver in the marketplace itself. That means most people do not want any superintending body or organization to make decisions on product availability based on social or ethical grounds.

Information

There is further confirmation in this wave that most people want neutral, accessible information on biotechnology to be available. The main factor contributing to consumer confidence is transparency about safety and the regulatory approval process. The fact that information is freely available seems sufficient to convince most that there is no hidden agenda; transparency seems to indicate that government is properly motivated and committed to informing citizens. However, as has been consistent, most people don't want the information sent to them (or "pushed") – they want to be able to access (or "pull") it when they feel the need.

As such, most people would not endorse a government advertising initiative on biotechnology or GM foods. They see this as an unnecessary expenditure. Most people would like to see a biotechnology web site and/or a registry where they could sign up for updated material to be sent or e-mailed. There is also a willingness to see information brochures placed in supermarkets.

Conclusion

At this time, there is a widely held sense that biotechnology advances are inextricably linked to societal progress, that its development is bound to modernity, and that its expansion in Canada and worldwide is inevitable. Even among those who tend to be opposed to these technologies, this sense is clearly evident, and presents itself as resigned acceptance. Among the vast majority, there is clear trepidation about some of the more invasive technologies (cloning, using animal genes in humans), but for the most part, there is hope that these advances will improve people's lives. The issue now is about managing the risks, not eliminating them, and this role of managing the risks is what Canadians hope government can help with, although at this juncture they are not sure that government is willing, or able, to do so.

Awareness is not driving concern; it is driving the growth of more complex, nuanced views toward the technology. This evolution evidences itself as case-by-case assessments of applications, and the inclusion of qualifications and caveats about how these products should be introduced. For most, the issue is not about whether the products will be available, but how it will be done to ensure risk is minimized.

Detailed Findings

A. AWARENESS, FAMILIARITY AND INTEREST LEVELS

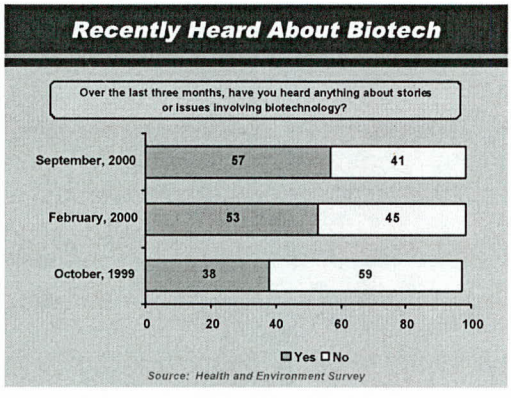
AWARENESS

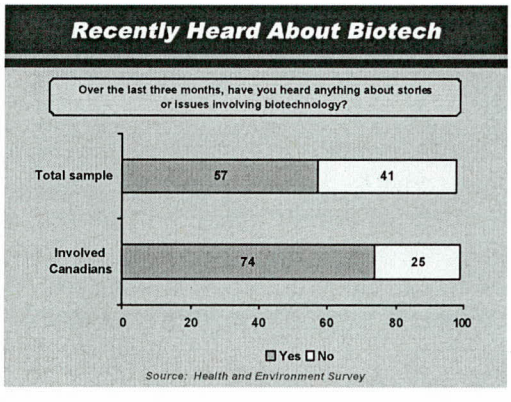
Biotechnology is no longer an obscure subject for most Canadians. Increasing numbers report hearing and talking about biotechnology though there still are very low levels of familiarity, interest or intellectual engagement in the issue. In general, Canadians acknowledge the potential benefits and risks of the technology, reject polarizing arguments of support and opposition and have assumed a casually watchful and mostly neutral stance.

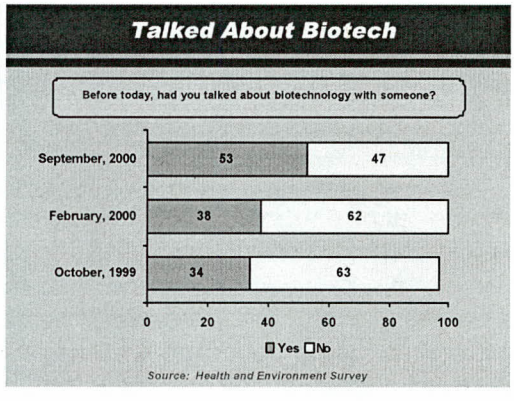
Over the past year, awareness levels have been growing moderately but steadily until, as of the fall of 2000, more than half of Canadians reported seeing or hearing something about biotechnology in the previous three months. Among *Involved Canadians* – the segment of the population that is much more engaged in public policy issues and which displays much more aggressive information-seeking behaviour – the percentage of people expressing reasonable levels of awareness reaches about three-quarters. In addition, growing numbers of Canadians say they have discussed biotechnology in some context recently, a finding that was reinforced in focus groups.

Not surprisingly, these findings reflect what respondents in the groups have noticed: increasing volumes of media coverage. Acting out classic communications theory, most focus group participants had accepted that media was placing biotech on the public agenda and agreed that had precipitated higher levels of awareness and discussion, but most divorced their personal assessments from the perceived media analysis. In general, they tended to believe that media coverage was negative to neutral on an issue they thought was more technical than emotive. As they examined their own philosophical positions in discussion, most (with a relatively small minority of entrenched opposition) said unlike media, they tended to lean from neutral to mildly positive.

The following three sets of results illustrate the steadily increasing levels of awareness and discussion. It is quite noteworthy to see increases of 50% over the past year in the numbers of people who say they've heard or talked about biotechnology.

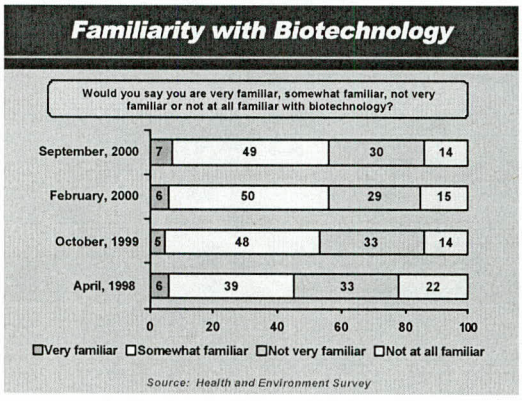


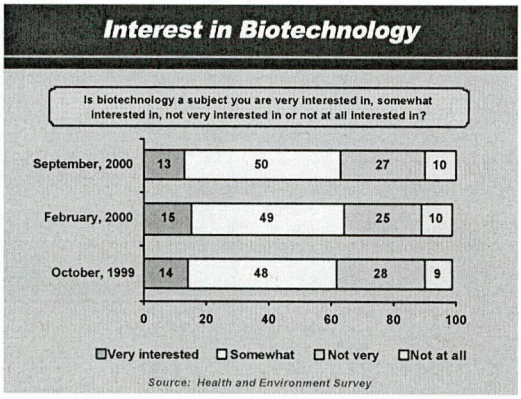




FAMILIARITY AND INTEREST

Though there have been significant increases in awareness, there has been no movement at all in levels of familiarity or interest. The number of Canadians who claim significant familiarity with biotechnology is very small and static, perhaps because so few people show significant levels of interest in the subject despite the mushrooming volume of media coverage. As indicated earlier, people are noting the media volume and the implied importance that would confer on biotechnology, but they express very little interest and are actively deciding not to engage in any substantive way. Focus group work suggests that most find the area too complex and technical. In addition, though most express concern about potential risk, they are both resigned to the inevitability of risk and confident that somewhere, someone is in charge of trying to mitigate that risk. In a world replete with threats and risks, to many these seem to be less urgent and commanding of immediate attention. To others, the risk/benefit equation seems, on balance, to tilt towards the benefit side meaning they can anticipate positive outcomes without having to expend much energy to learn a great deal.





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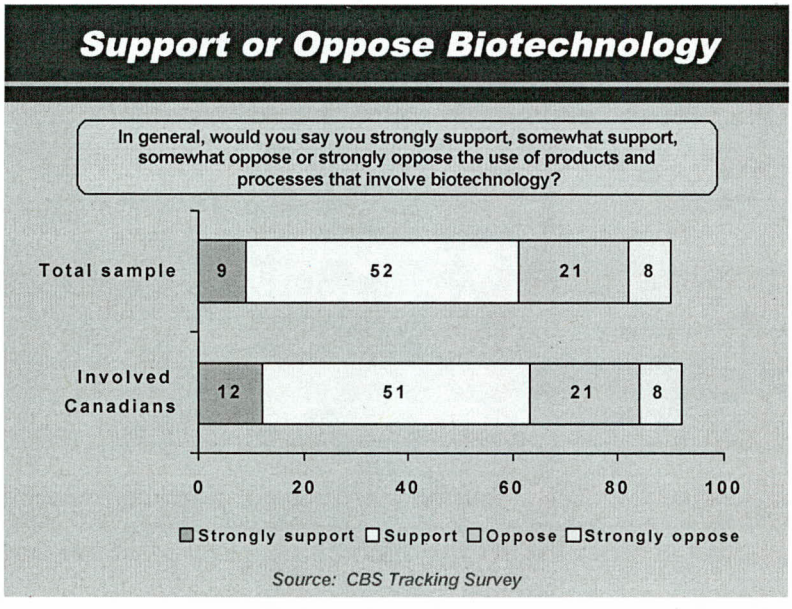
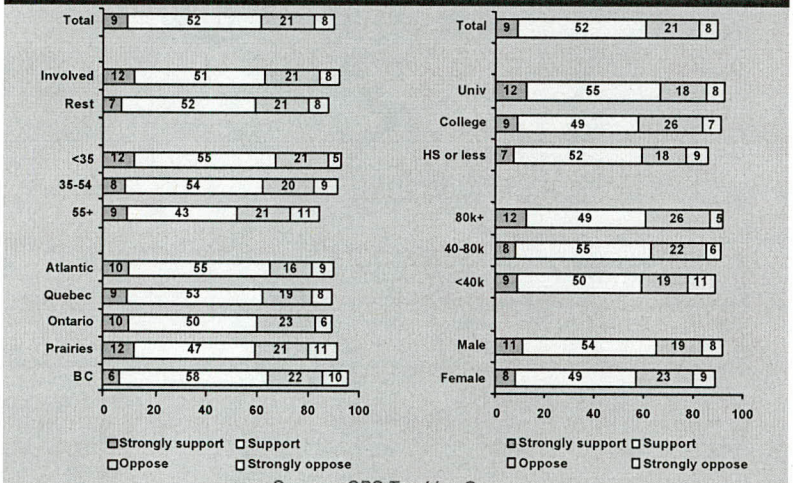
B. Top-of-Mind Disposition – Support, Opposition and Semantics

SUPPORT/OPPOSITION

A significant majority of Canadians continues to remain neutral to positive about biotechnology. A majority expresses direct support but does so with little intensity while a small, entrenched minority remains negative and feels that sense of opposition quite strongly. On the whole, the combination of hard data and focus group discussion indicates that there are higher levels of uncertainty and mixed feelings towards biotechnology in the fall of 2000. For instance, the perceived ratio (current and future) of benefits to drawbacks has weakened in various areas of biotechnology – health, environment and food. A general summary would say that over the past year, views have become more moderate and more equivocal rather than moving to outright support or opposition.



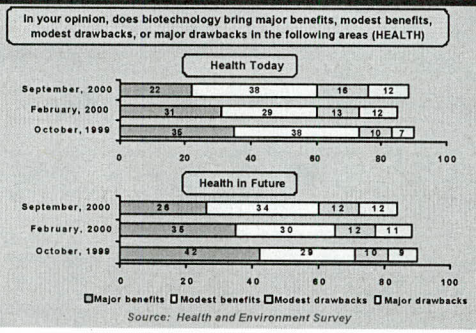
Support or Oppose Biotechnology



Source: CBS Tracking Survey

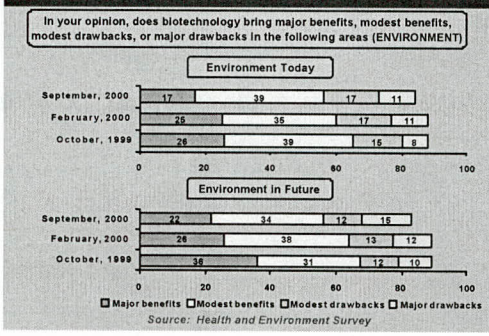
The following sets of graphs show the weakening over time of the benefit to drawback ratio. Over the three survey waves, there has been steady erosion in the number of people who see *major* benefits and a move towards more equivocal ground. That they are gravitating towards the middle is borne out by the observation that the proportion of respondents who see major drawbacks has stayed relatively constant.

Benefits and Drawbacks - Health

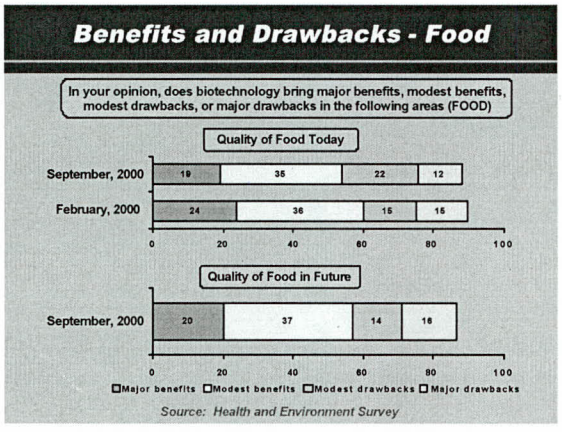


Source: Health and Environment Survey

Benefits and Drawbacks - Environment



Source: Health and Environment Survey



SEMANTIC IMPACTS

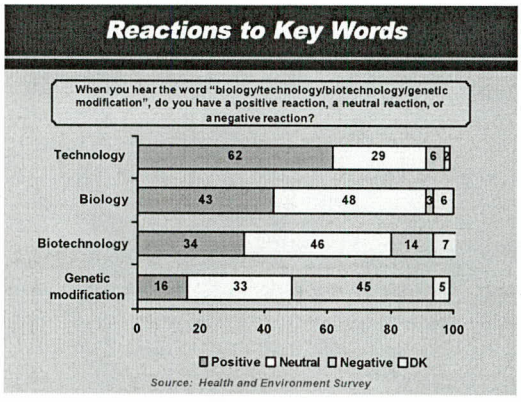
This survey expanded on the work of its predecessors into the impact of words and definitions. It established clearly that words matter because, absent significant levels of real knowledge about biotechnology and its products and processes, people have internalized a variety of impressions and definitions. That variability emerges in focus group discussions. In general terms, the findings are:

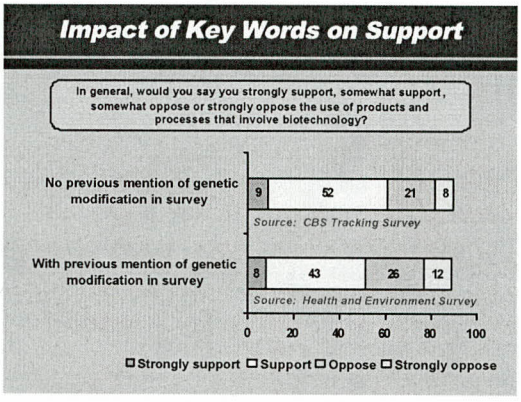
- *Technology* has strong positive attributes and generates positive attitudes. Canadians invest in high technologies all hope for the success of the Canadian economy and the personal occupational and financial success of their children.

- *Biotechnology* benefits from that positive halo. It raises no significant negative reaction. However, its image has less to do with genetic modification and much more to do with laboratories, science and medical discovery. It is seen to be a very broad category that includes many things that would not actually involve biotechnology.

- *Genetic modification* as a phrase drives negatives upwards. Focus group discussions show that it is defined very narrowly and its image connotes gene splicing, invasiveness and negative associations with *human* genetic manipulation, like eugenics. It does not, at first blush, connote genetic modification of plants and animals.

As a communications exercise, some respondents were asked about *genetic modification* while others were not. The phrase raised large negative reaction and drove down expressed support levels for biotechnology.





C. Biotechnology Applications

Canadians continue to resist offering systemic views on biotechnology applications. They evaluate each application on its merits, bringing a consistent analytical framework to bear on a case-by-case basis. That framework involves an implicit risk/benefit calculation that depends 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.

As has been found in both previous waves, health and medical applications are the most positively received and the strongest positive drivers for biotechnology. Environmental applications come next. Conversely, 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 resistance. Human gene modification is the most difficult concept for most people and requires the largest set of expressed benefits to render it acceptable.

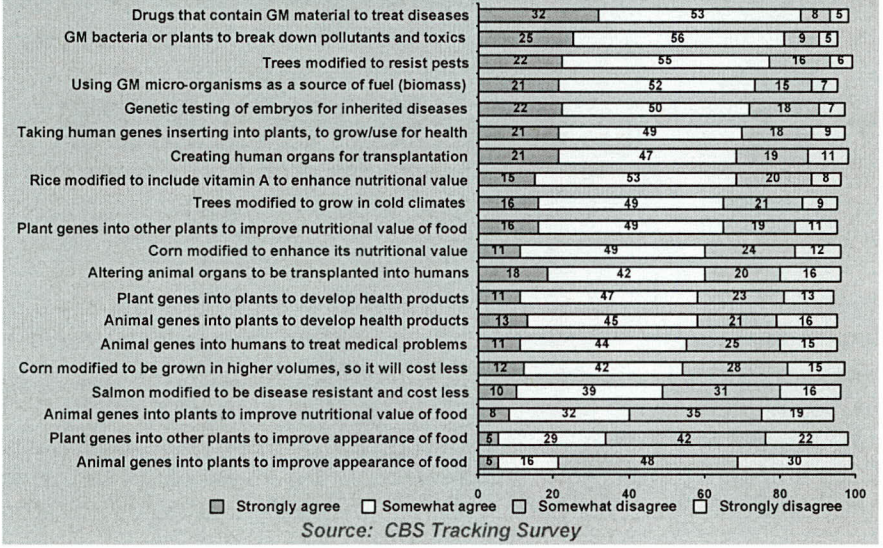
Focus group discussions revealed that most people think only about medical and food applications. These include:

- GM crops
- Gene treatments and drugs
- Medical therapies
- Cloning

Environmental applications are virtually unknown. It is clear people are receptive to the benefits case for environmental applications, particularly 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.

Ultimately, when it comes to applications, the purpose/outcome is the key positive driver, while the process is the key negative driver.

Acceptability of Applications



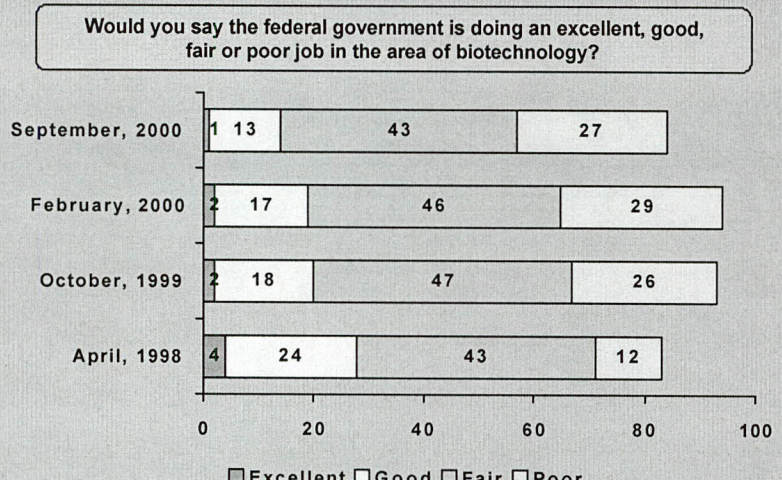
Source: CBS Tracking Survey

D. Federal Government Performance, Priorities and Roles

PERFORMANCE AND PRIORITIES

There has been a weakening in the public assessment of the federal government's performance in biotechnology. Fewer people are willing to give the government excellent or good ratings this fall and those numbers have been eroding steadily over the past year. There is, however, virtually no understanding or knowledge of the government's biotechnology policy or regulations. Focus group discussions suggest that the weakening assessments are largely a function of both the growing uncertainty about biotechnology itself and a general disenchantment with the current capability of government.

Federal Government Performance

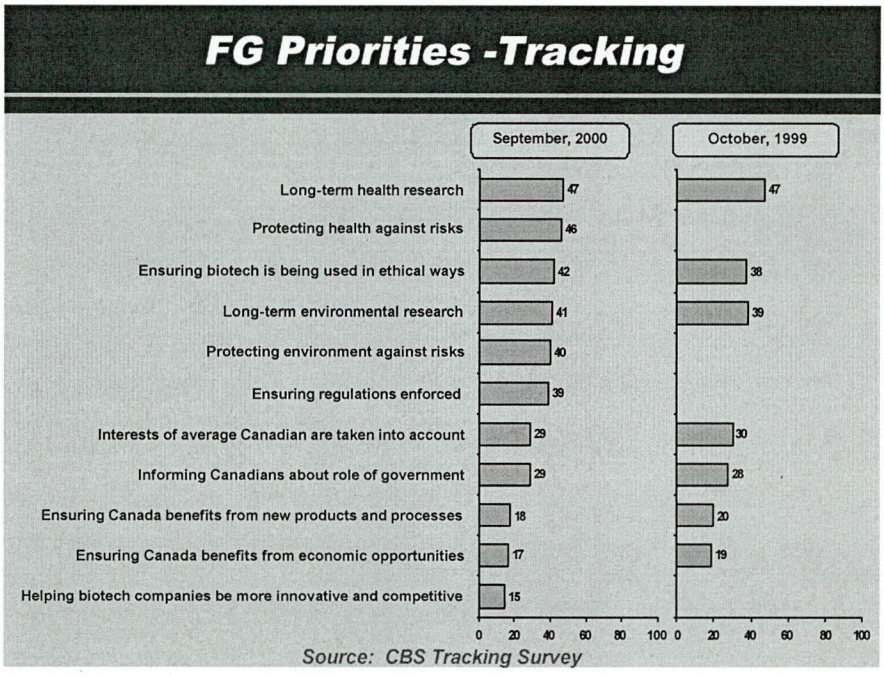


Source: CBS Tracking Survey

Further, there are indications that most people want to assign to the federal government significant roles in the area of biotechnology. Most believe that the government:

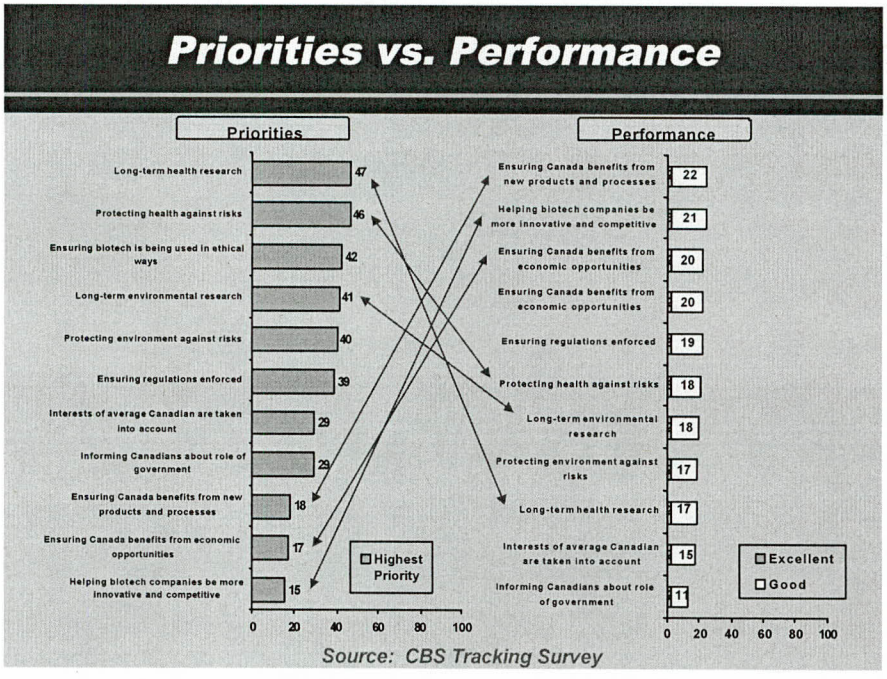
- has a larger role to play;
- must regulate aggressively to ensure product safety; and
- can and should find the appropriate balance among competing demands and interests.

As they assign priorities in the area to the federal government, Canadians emphasize health and environmental stewardship with a strong focus as well on research into the long-term health and environmental impacts of biotechnology. And though Canadians see potential economic benefits and want Canada to become a world leader in biotechnology, those concerns are secondary. Focus group discussions strongly reinforced these findings. This fall, the survey instrument added new potential priorities to the questionnaire and asked Canadians to rate the relative priority of the various suggestions. The following graph presents those findings and compares them to the results of a year ago.



Source: CBS Tracking Survey

There continues to be an interesting and telling mismatch between the priorities expressed by Canadians and the way they rank the actual performance of the federal government in those areas. Bearing in mind that most people do not have direct knowledge of actual federal government activity, they nevertheless have come to general conclusions. They tend to believe the government is doing better in areas they think are secondary in importance and less well in the areas they believe to be of paramount importance. That mismatch is quite evident when the expressed priorities are graphed alongside the assessments of performance.

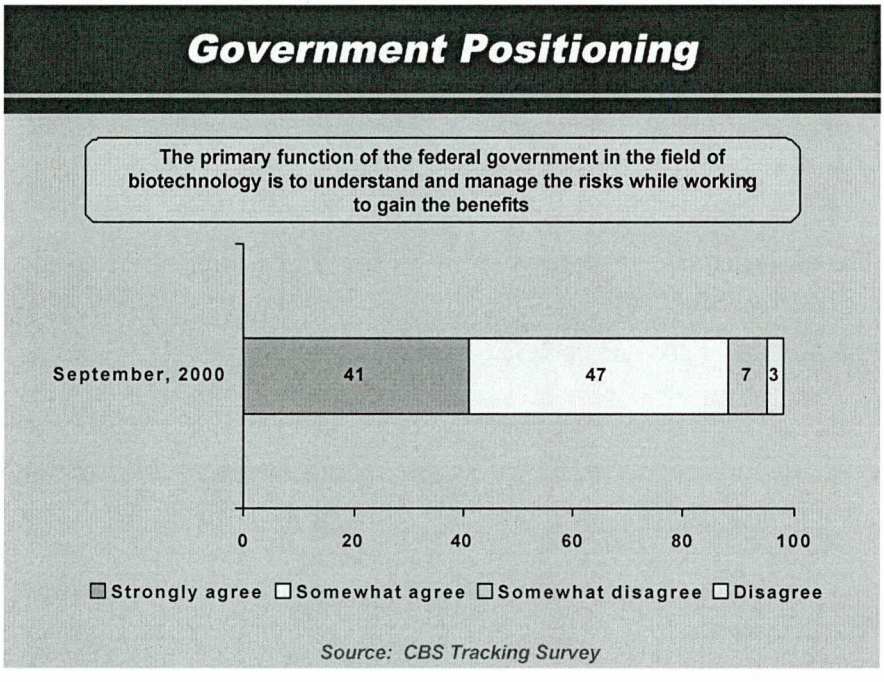


Source: CBS Tracking Survey

ROLES/POSITIONING

This research wave reconfirms previous findings that the best positioning for government in public opinion terms would balance between seeking the benefits of biotechnology and exercising rigorous stewardship. Further, the key to its credibility is to show that it understands and is managing appropriately the risk/benefit equation.

The research confirmed that current key messaging used by the federal government and the Canadian Biotechnology Strategy (CBS) yield strong levels of support. Further, the current CBS paradigm of three pillars – stewardship, benefits and citizen engagement – are very salient and appropriate. For example, people were asked to agree or disagree with the following current message about the federal government's role.



The research wave tried to expressly evaluate the current and preferred balance between the government roles of stewardship and industry support to derive economic benefit. The results:

- Canadians believe that the federal government can and should play dual roles, both regulating and supporting the sector.

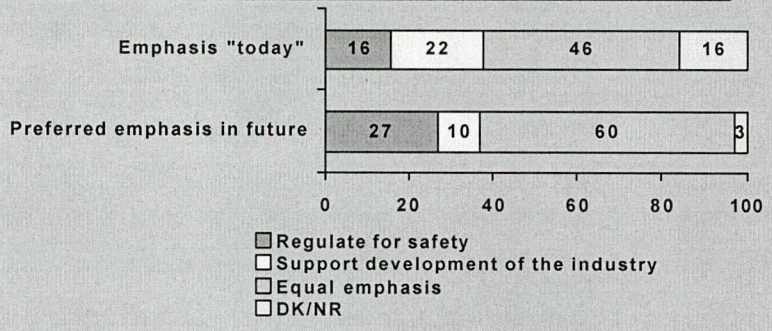
- Their main priority would be a greater emphasis on regulation, research and science because though they want Canada to be a world leader in the technology, Canadians tend to believe government efforts lean too far towards economic support right now. In other words, public opinion would see a re-calibration towards stewardship.

- This emphasis on regulation and science would encompass the work of others besides government. For instance, there is a desire to have government finance work done at arm's length to conduct and review the science underlying biotechnology.

Specifically, a majority of Canadians believes in both functions (stewardship and promotion) for government and that they can be carried out in an appropriate and balanced way. Following on from the findings of the survey, focus groups indicated that as long as the functions are clearly separated, most believe that they can co-exist within government. Many believe they can even co-exist within departments given appropriate separation. Few believe, however, that the same people and unit can do both.

Stewardship Versus Promotion

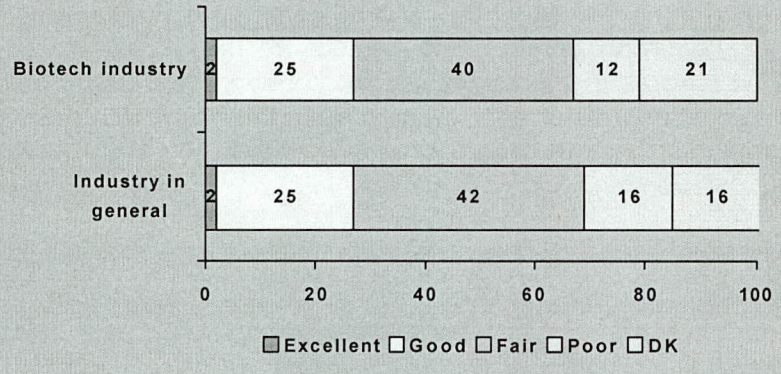
In the field of biotechnology, one role for the federal government is to regulate the products that are being developed, to ensure that they are safe for our health and environment; another role is to support the development of the industry, which helps create investment and jobs. With respect to biotechnology,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



Source: Health and Environment Survey

Balancing Its Activities

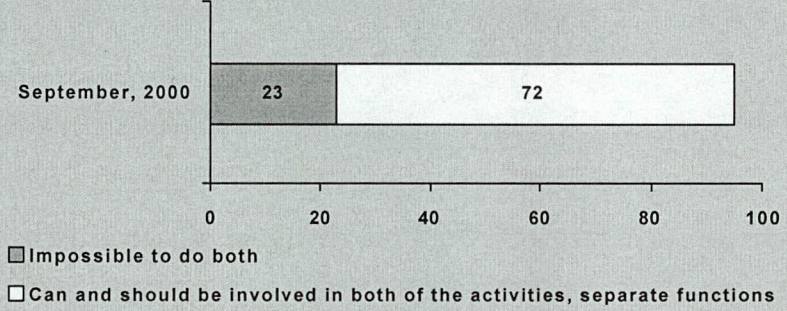
In your view, does the federal government do an excellent, good, fair, or poor job at keeping its regulatory and support activities *to Canadian industry/the Canadian biotechnology industry* separate?



Source: Health and Environment Survey

Balanced Role?

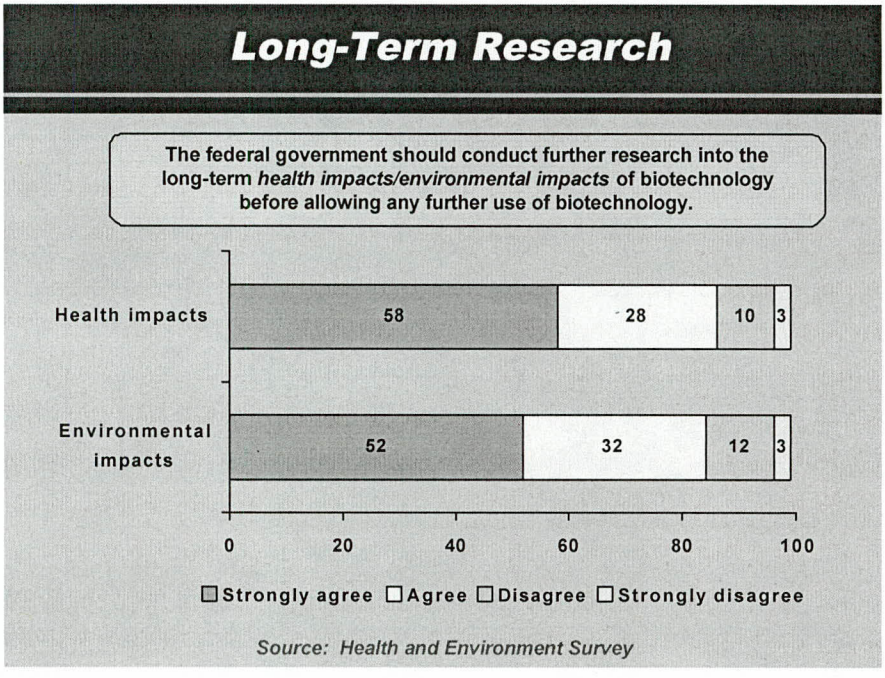
Some people say that it is impossible for the federal government to regulate industry and to support industry at the same time. Other people say that government can and should be involved in both of these activities, as long as the two functions are separated (between departments). Which of these two views is closest to your own?



Source: Health and Environment Survey

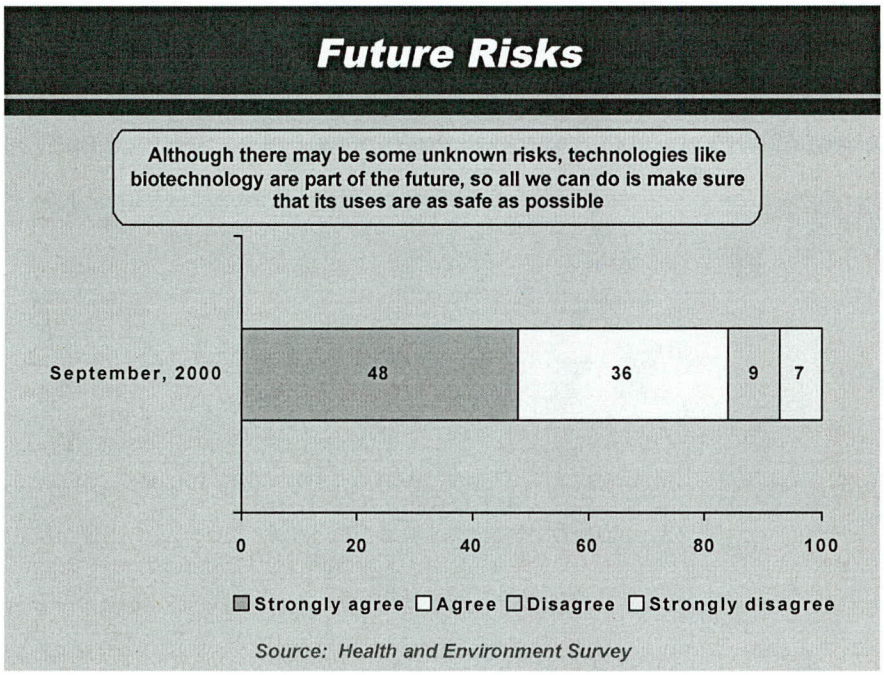
E. Managing Risk

Underlying the demand for an increased emphasis on stewardship is the concern and uncertainty people carry about biotechnology and its long-term risk. In fact the need to understand the long-term impacts is so central to developing a comfort level that, asked in isolation, most say the government should not allow the further use of biotechnology until the long-term research is conducted.



However, these views soften substantially when people are forced to trade off benefits and risks or are confronted with the potential loss of benefits. At that point, most decide they want biotechnology activity to proceed as long as government appears to be managing risk intelligently. Appropriate management of risk would seem to rest on putting into place strong regulation and long-term scientific inquiry.

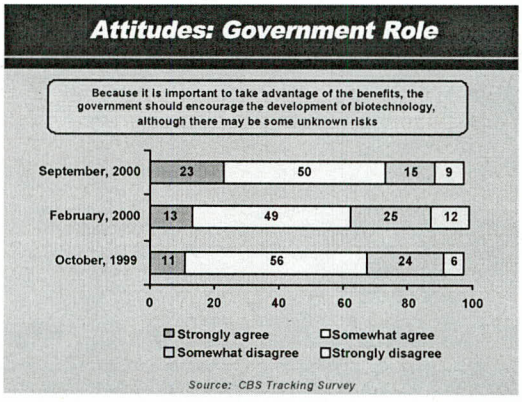
In reality, most Canadians have resigned themselves to the presumption that risk is pervasive in modern society and that *managing* risk is about as well as anyone can do.

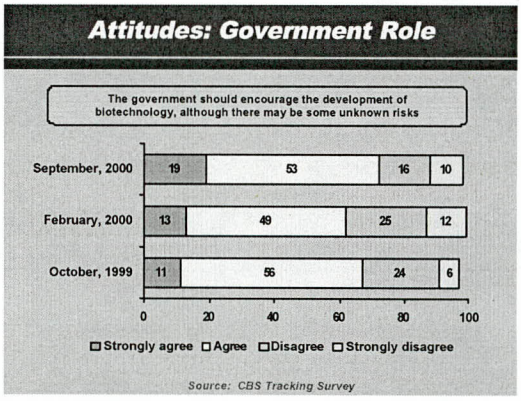


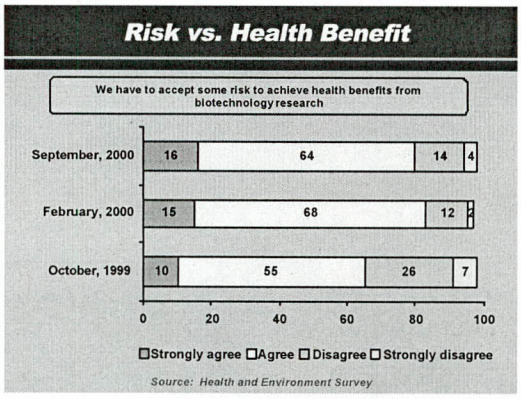
The evaluation of risk and the risk/benefit ratio is a fundamental issue in opinion about biotechnology. As indicated earlier, it affects the acceptability of all biotechnology applications. Because of its importance, each research wave has probed the issue in a number of different ways to ensure the phenomenon is thoroughly understood. 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.





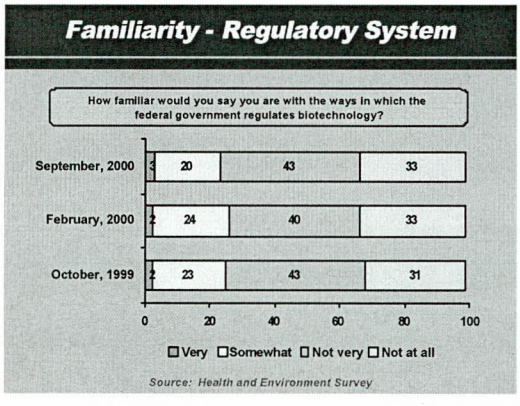


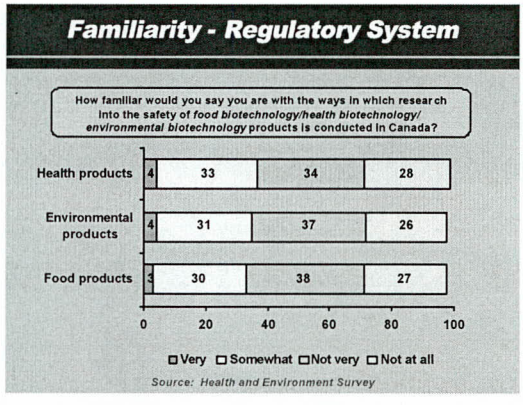
POLLARA AND EARNSCLIFFE

F. Regulation of Biotechnology

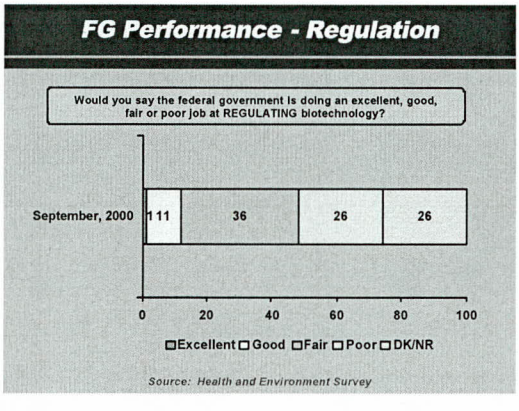
Canadians, by and large, are uncertain about Canada's biotechnology regulatory system.

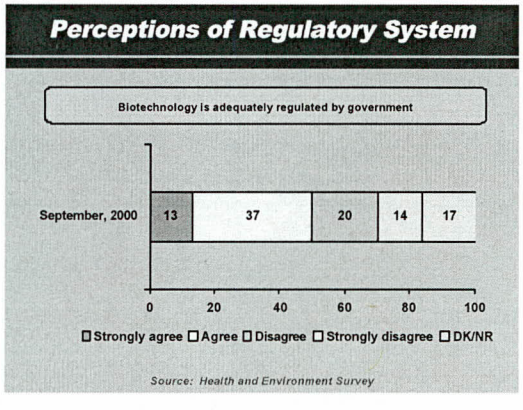
It is clear they know very little about the way it works. A negligible proportion of Canadians claims strong familiarity with the regulatory system as a whole or with the way research is conducted into the safety of biotechnology products.

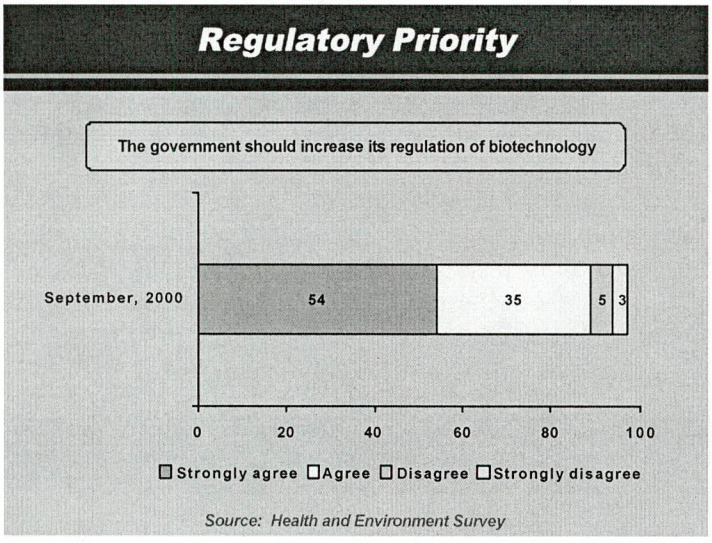




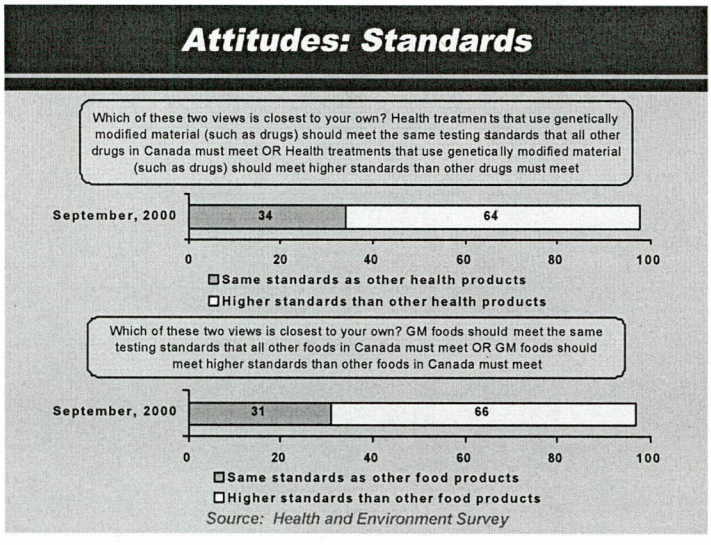
The lack of familiarity drives down assessments of the federal government's regulatory performance and drives up demands for more regulation.



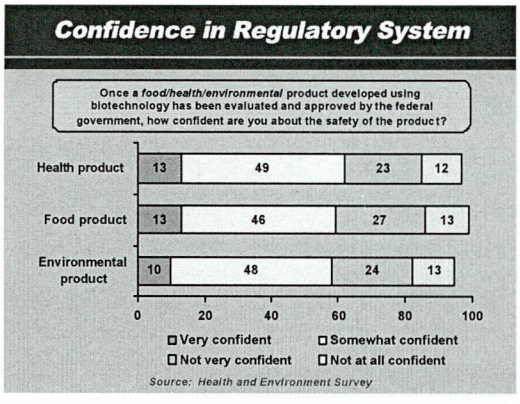


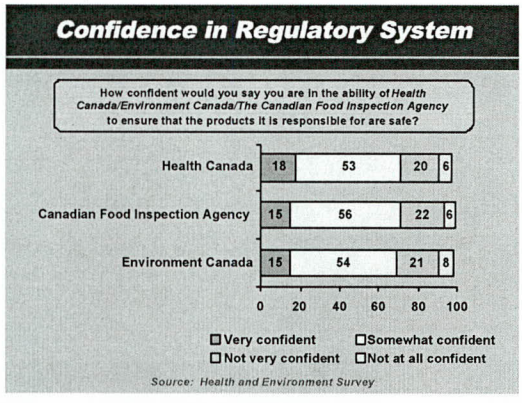


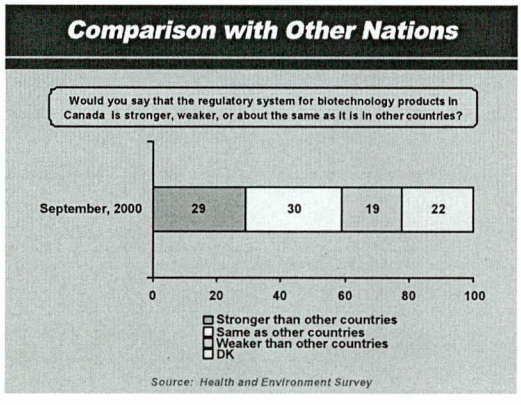
The demand for increased regulation is driven, as well, by underlying opinion that says that biotechnology approvals should require higher testing standards than other product approvals.



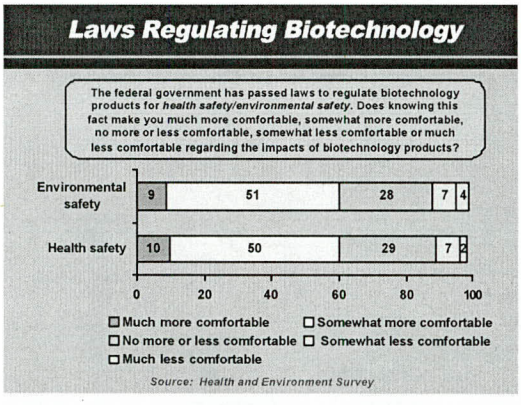
Nevertheless, despite the lack of knowledge and uncertainty, Canadians continue to presume things are working the way they should. Most express some level of confidence that federally approved products are safe. Focus groups show that the presumption is probably larger for health products and that most people don't much want to look very deeply into the issue for fear they will discover uncomfortable information. In addition to the presumption, there is clearly a strong desire to *believe* all is well. Interestingly, confidence increases when the actual regulatory department is named. Those confidence levels translate into yet another presumption: that the Canadian regulatory system compares favourably with that of other countries.

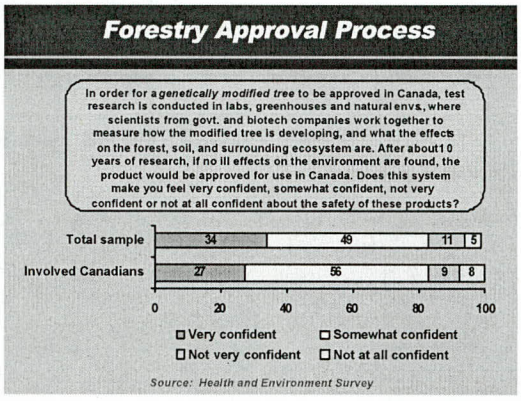


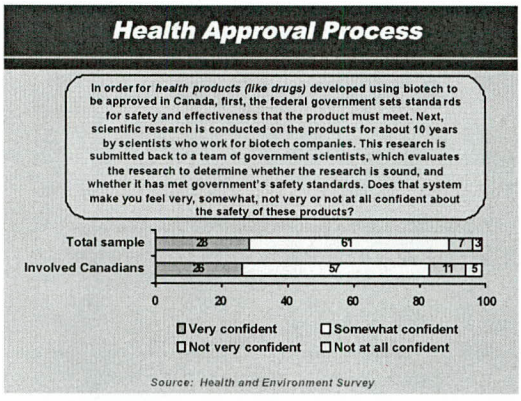


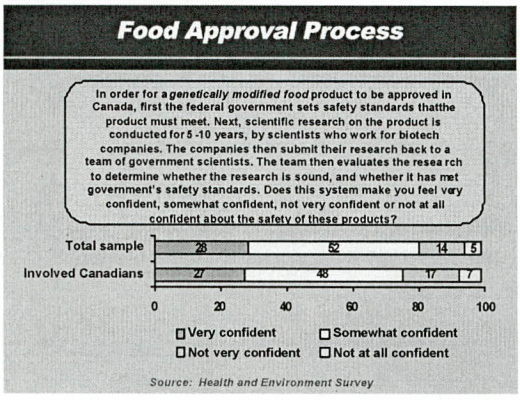


Confidence also increases when people are told about Canada's legislation governing regulation. And the comfort level increases dramatically when the actual approval process is described. Three separate departmental approval processes were tested and all increased comfort levels substantially.









G. Science and Credibility

To most Canadians, the acceptability and approval of biotechnology products and processes is largely a technical and scientific issue with relatively few significant moral or philosophical determinants. Certainly, the majority of Canadians rejects as political – and therefore marginal – much of the ideological debate over genetic modification.

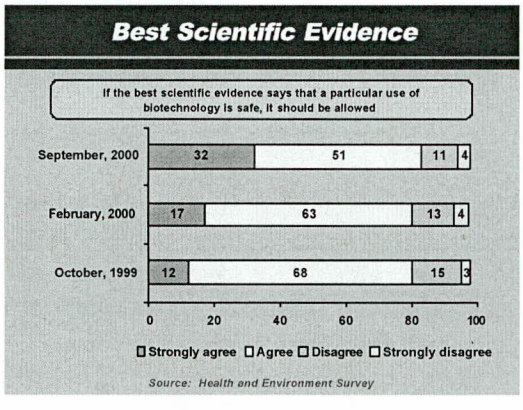
All three waves of research have produced the same results – for most, good science should be the main arbiter of regulatory approval. There are some important caveats to that general attitude:

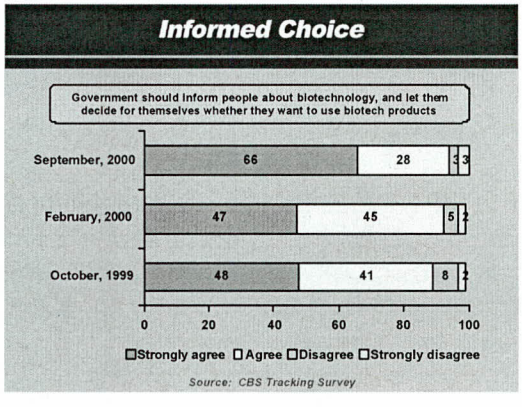
- The proposed uses or outcomes have to be within a range of acceptability. Good science will not trump highly contentious applications that seem to fail the risk/benefit test.
- Biotechnology products have to meet higher scientific standards than non-biotech products.
- Long-term research into potential impacts is important to the credibility of the science.

In fact, the general willingness to move ahead in exploiting biotechnology increases substantially if people believe they have received scientific assurances of safety from credible sources.

Canadians believe the determination of safety and decision-making on approvals should be left to experts. They expect government to harness expertise to help it carry out its assigned roles in areas like regulation, safety, patenting and privacy. They do not want self-interested people or institutions inside that decision-making loop. In particular, they strongly dislike a system whereby the industry conducts the science.

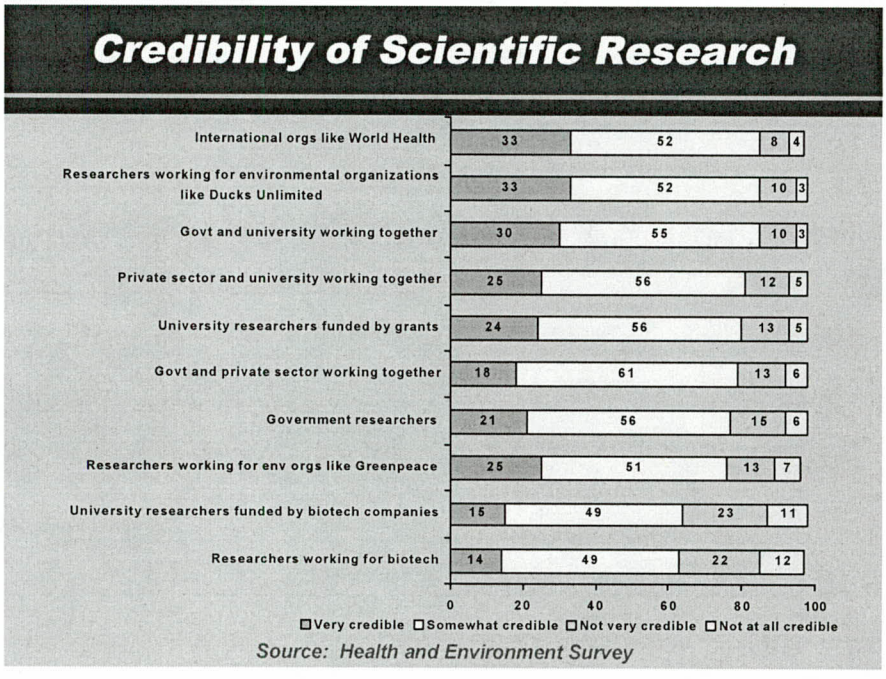
However, many say they want Canadians themselves to be the decision makers in the consumer marketplace. There is a widespread reluctance to allow government to decide whether a biotech product is unacceptable (on grounds other than safety.)





The survey results suggest that scientists are highly credible voices on biotechnology, virtually all generate a reasonable level of credibility. Collaborative arrangements, international bodies and university-based science generate the most credibility.

Focus group discussions reveal another level of analysis. Most people rest their assessment of credibility on the degree to which the person or institution is perceived to be at arm's length and independent of controlling and/or funding influencers. The source of funding seems to be the critical test. As a result, many people say university scientists are much more credible than other scientists because it is assumed they are free from funding pressures and therefore, more "independent." Similarly, government regulators maintain a relatively high degree of credibility because they have no financial stake in outcome and are presumed to be working in the public interest. Lastly, credibility varies significantly among NGO's and interest groups. In general thesis, the less "political" and the less "self-interested", the higher the credibility.



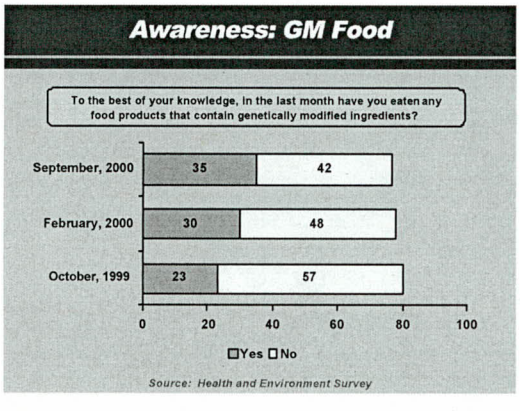
H. Genetically Modified Food

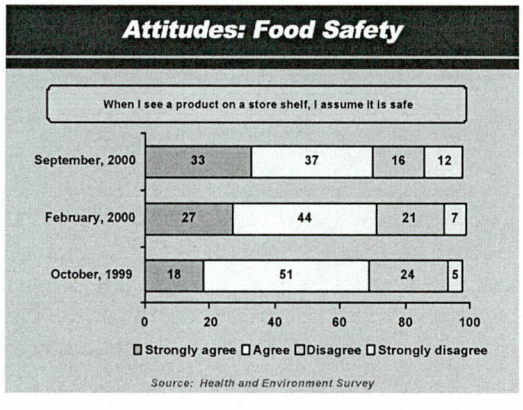
AWARENESS

The debate over the past year about genetically modified food has increased awareness and left more people personally uncomfortable about buying GM food. However, it has not convinced most Canadians that GM foods are fundamentally risky or unsafe. The lack of a health incident or the production of convincing evidence to the contrary has left most people believing the food safety issue is more political than personally relevant.

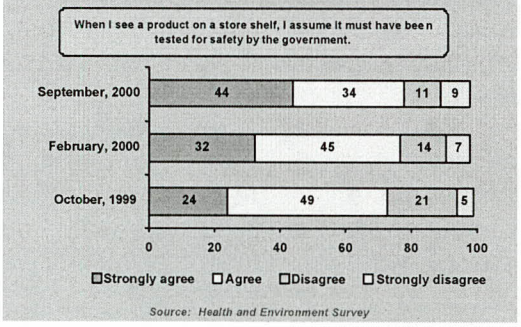
SAFETY

Most Canadians continue to believe that food on grocery shelves is safe and has been tested even though they continue to confuse testing with inspection. The majority of Canadians express a willingness to consume GM food, particularly if there is some clear benefit. Put another way, there is only a small minority that rejects GM food under any condition or circumstance.



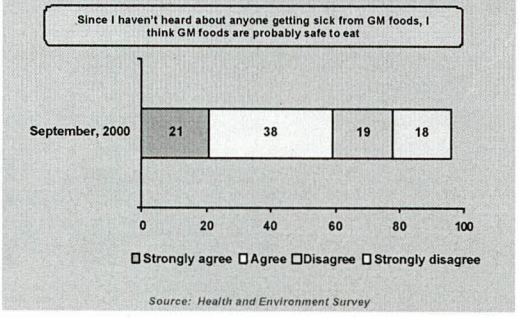


Government Tested?



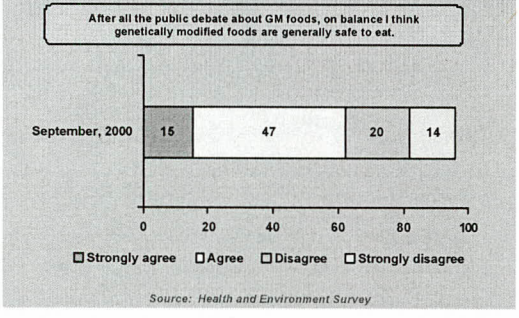
Source: Health and Environment Survey

Attitudes: GM Food



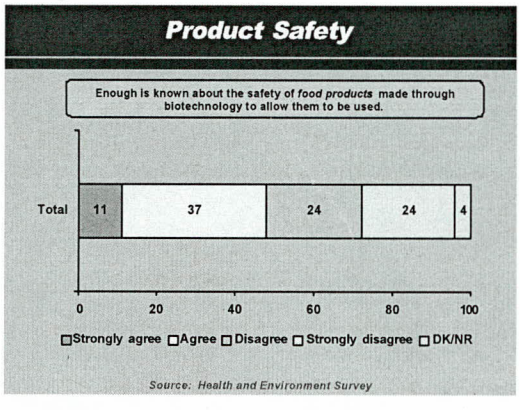
Source: Health and Environment Survey

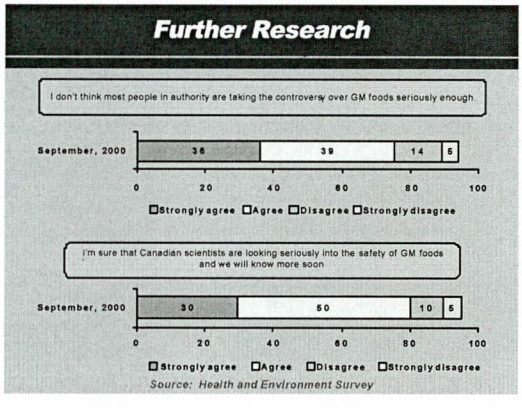
GM Food Safe?



Source: Health and Environment Survey

Of all the biotechnology sectors, this one continues to be marked by opinions with the most shallow roots. People are not settled in their views and can be swayed by argumentation quite easily. Their ambivalence emerges through their ability to carry conflicting views. For instance, despite their general agreement that on balance GM food is safe to eat, a significant number of people strongly believe that not enough is known about the safety of GM food to allow their use. They tend to believe that the authorities are not taking the GM food controversy seriously enough while they also say they're sure Canadian scientists are looking seriously into safety issues. Most people want better answers about long-term risk.

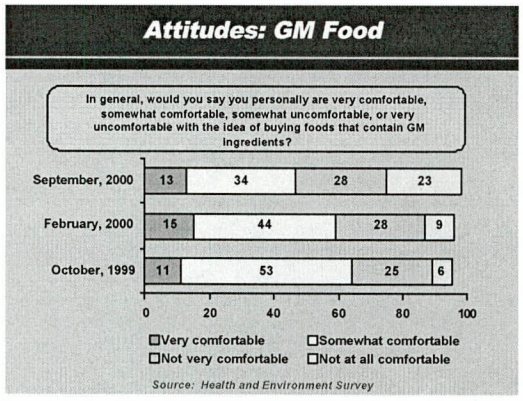


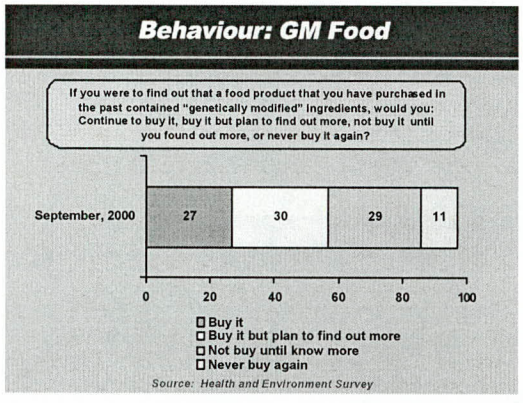


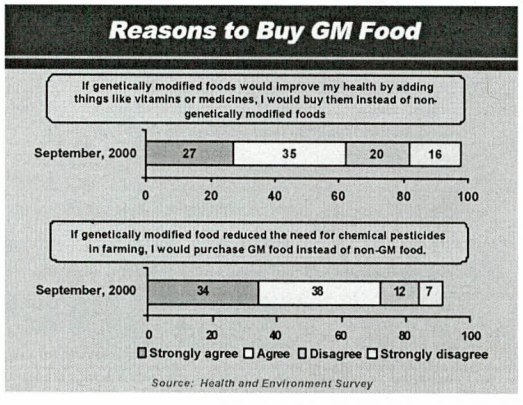
PERSONAL USAGE

On a personal level, there is a growing discomfort with GM food. About half of respondents said they were uncomfortable buying GM foods and a significant number said they would stop purchasing for a while if they knew a food was GM. On the other hand, only a small percentage said they would never buy the food again. It is clear that opinions about GM foods remain in flux, partially because people tend to believe the food safety system is sound. Evidence of that comes from the way contrasting argumentation affects positions. When potential benefits of GM foods are presented, most respondents are willing to consider them and some switch buying intentions. And again, the higher the marginal personal benefit, the more persuasive the argument. So, for instance, in focus groups, argumentation that posited the benefit of reducing the amount of chemical pesticides used in food production (and hence the possibility of its

presence in food) was much stronger than the effect of GM food on reducing world hunger.

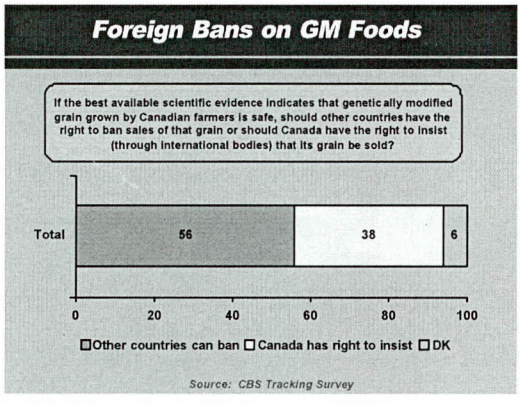


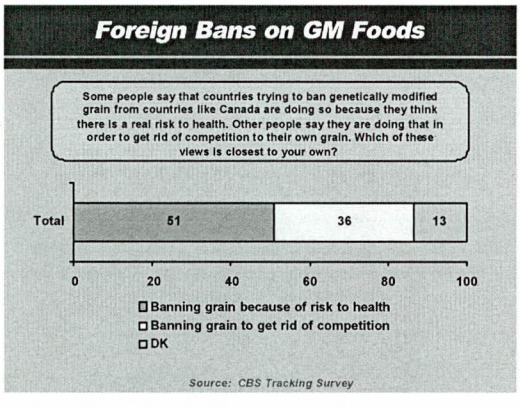




GM FOOD TRADE ISSUES

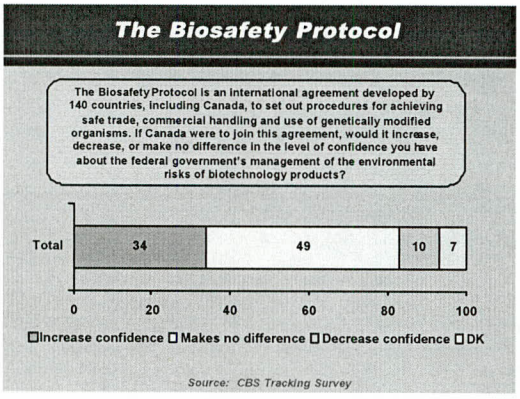
The survey suggests that Canadians are ambivalent about GM food exports and do not believe that Canada has the right to insist that its products be accepted. Most people do not believe that impediments put in place by other countries are driven by trade considerations. Most people believe those countries have the right to, and actually do, make decisions based on their assessment of the potential risk.

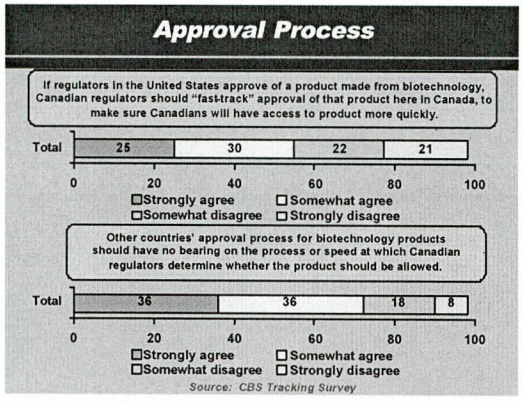




Most Canadians embrace international arrangements on biotech in the science and regulatory spheres and gain confidence once they know such arrangements are underway. Focus group discussions confirmed these findings and established that collaborative international arrangements convey a sense that the implied "pooled" resources are more capable of identifying risks. However, most participants displayed fairly strong resistance to the idea that such international agreements could "force" products into Canada.

Similarly, when it came to regulatory approvals, Canadians were willing to speed up approvals here to match quick approvals in the U.S. if that meant we could have access to products more quickly. However, as a matter of principle (and when the explicit benefit is removed from the question) most people say the approval process in other countries should have no bearing on the process or speed at which Canadian regulators work.



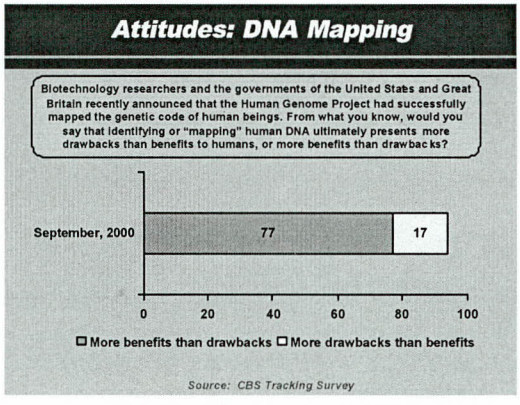


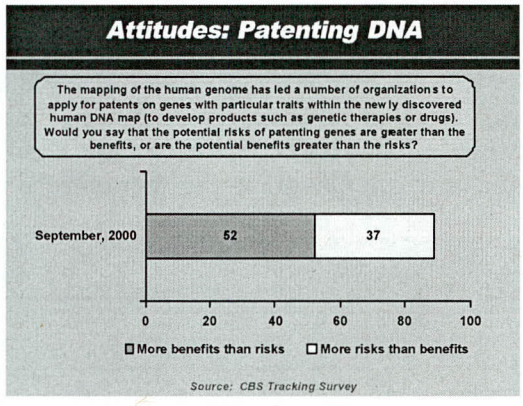
I. Patenting

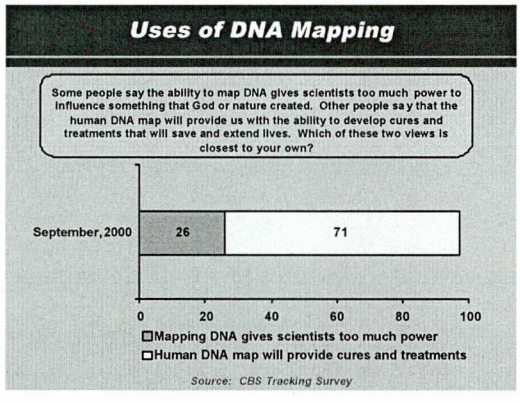
GENOMIC MAPPING AND PATENTING

This research wave expanded on previous work on patenting, honing in on two areas – the patenting issues that arise from genome mapping and reaction to the most recent Harvard oncomouse ruling and the federal government decision to seek leave to appeal to the Supreme Court.

A strong majority of Canadians sees more benefits than drawbacks to mapping the human genetic code. Almost as many believe that the mapping process will yield worthwhile medical cures and treatments rather than give scientists too much power to influence something that God or nature created.







The survey also provided an indication that most people see more benefits than risks in allowing the patenting of genes and gene sequences. However, focus group discussions reveal that once people fully understand the issue, there are significant objections raised. Very few have moral or religious reservations – the objections are raised on the grounds of access and affordability. There is a fuller discussion of this issue in the Focus Group Findings but in summary, people tend to believe patenting drives up pricing and reduces accessibility. They understand the argument that patenting creates incentive and rewards innovation and think those outcomes important. But when it comes to health and medical products (the primary products people associate with genomic research and patenting), most tend to believe the overriding principle should be equality of access without financial obstacle. Most people express strong views that the cost of pharmaceuticals cannot dictate who receives them, that people of average means should not have to suffer financial hardship to buy drugs. And they believe genetic patenting may well lead to both of those problems.

POLLARA AND EARNSCLIFFE

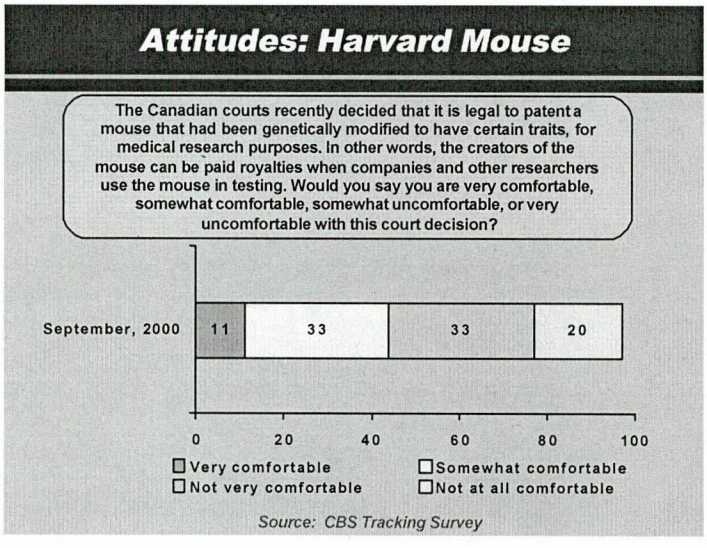
THE HARVARD MOUSE

When it came to the Harvard mouse and discussions of the patenting of higher life forms, discomfort levels rose. Half of the survey respondents said they were not very or not at all comfortable with the court decision granting the patent.

For some, the concept of patenting a whole animal brings the issue into clearer perspective and offends at an emotional level. For others (significantly more), the issue puts the pricing of cancer cures squarely on the table. Despite knowing that companies and researchers require some sort of incentive and reward, most reject the economic paradigm and drift towards ensuring that no cost accrues to people who require the therapies. When pressed on the issue, most say one of two things:

- most researchers are motivated by finding cures, not by money; or
- the government should ensure that the research is getting done elsewhere if the private sector won't pay for it.

The result of these underlying opinions was that most discussion group participants believed the government was right to appeal the lower court ruling and to begin consultations on the issue in order to have Parliament resolve it.



POLLARA AND EARNSCLIFFE

J. Genetic Privacy

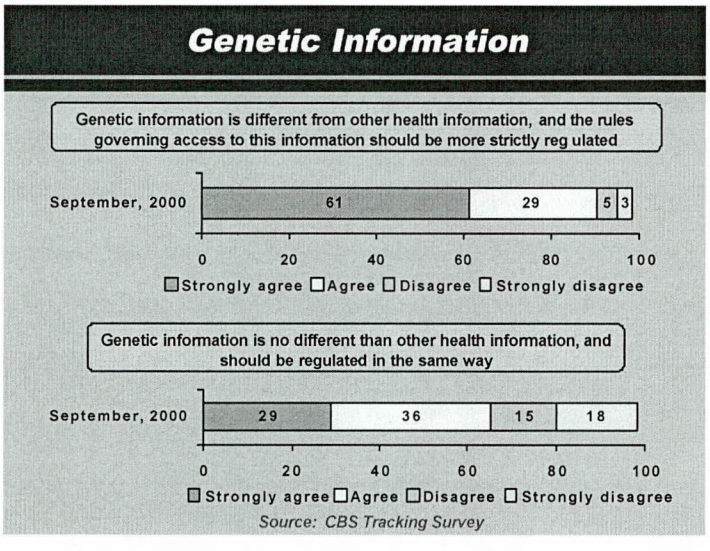
This was a new area of investigation for the biotech research project. It was probed in some depth in the survey and the focus groups and yielded firm views despite the fact that most people had not actively considered the issue before. The survey results were quite clear and the focus groups expanded on the underlying attitudes.

REGULATION

In general, there is overwhelming support for strong safeguards on genetic privacy with the intended use of the information being the key determinant of any willingness to allow information to be sought and collected.

Most people say genetic information is different from other health information. There is a deep conviction that genetic information is fundamentally personal and private. Group discussion suggests that people fear that genetic information conveys too much power to people who obtain it and there is a wide consensus that government has a key role to play in ensuring genetic privacy.

The following findings seem to indicate mixed views or ambivalence. In fact, the results may be more of an artifact of the question construction.



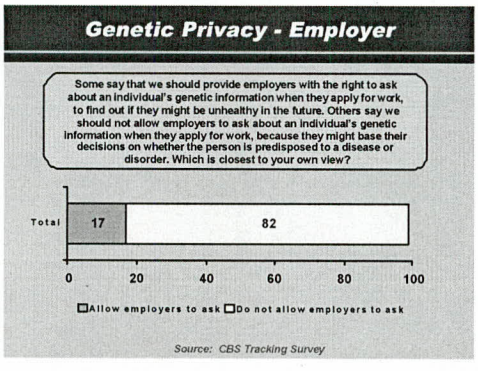
Groups suggest that most people believe health information is quite strictly regulated now. The wording of the bottom version in the graphic seems to have been interpreted as providing a "floor" for regulation -- i.e. the regulation of genetic information must be *at least* as stringent as the regulation of health data. The top version, on the other hand, seemed to suggest a higher "ceiling" – i.e. regulation that was more stringent.

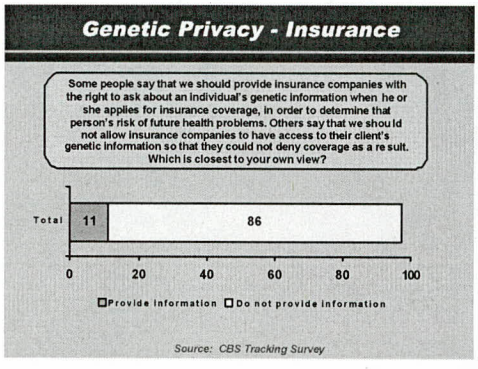
INSURERS AND EMPLOYERS

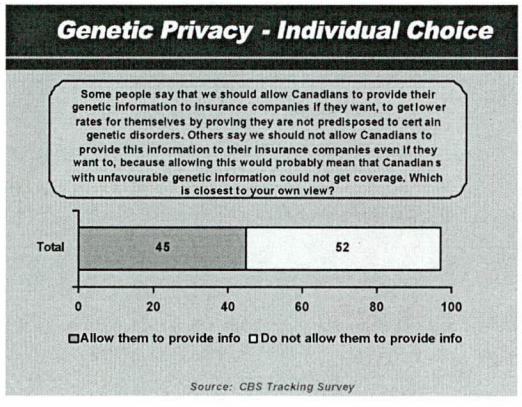
There is very little patience for the proposition that employers or insurance companies have a right to genetic information to determine suitability for employment or insurability. The opposition seems less an issue of the unreliability of genetic mapping data in predicting future problems and more an issue of unacceptable intrusion and unbalanced power relationships.

When it comes to insurance, the vast majority of people believe that insurance pools and shares risk and provides a way to protect poor-risk individuals. This is a highly desirable social value and trumps any suggestion that it places an undue financial burden on the insurer. In fact, though there was more patience in the survey to the suggestion that *individuals* could *volunteer* their genetic data to benefit from lower premiums, that patience quickly melted in discussion. After minimal reflection, groups rejected the argument saying it provided an inappropriate way to "end run" the societal need for pooling and sharing risk.

The suggestion that non-disclosure would create a "moral hazard" led most people to grudgingly agree that companies could sue for fraud but *only* if the person had the actual disease/disorder when he/she applied for coverage, not just the genetic predisposition.

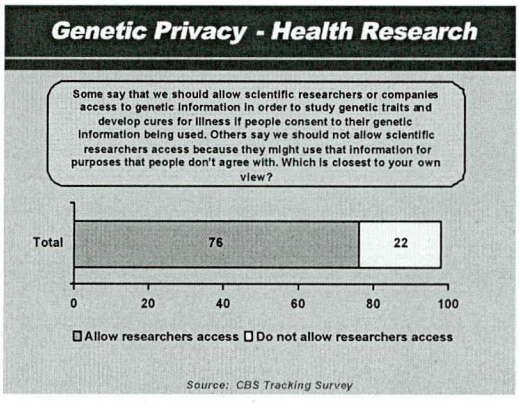


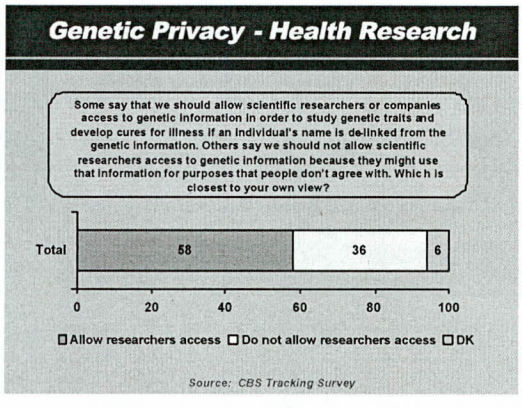




RESEARCH USAGE

More altruistic uses of genetic information are generally acceptable as long as there are commonsense safeguards in place. Most people believe there are substantial benefits to be gained from population genetic studies and that such studies are impossible without access to genetic data. As well, they trust scientists and medical researchers not to abuse their trust and misuse the information gathered. However, most people still would insist on informed consent before allowing even this kind of research activity.





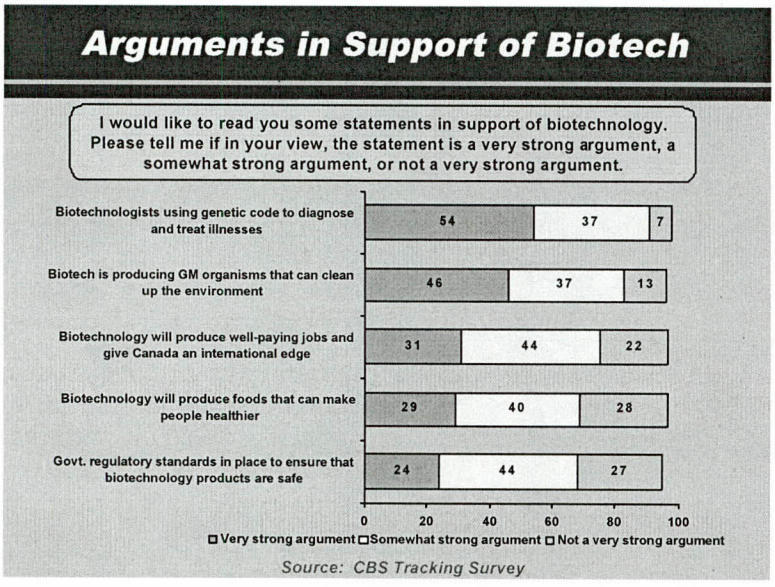
K. Communications Issues

MESSAGING

All three research waves have tested communications messaging, positive and negative, surrounding biotechnology products and processes. In this wave, we tested new positive messaging against negative messaging derived from some of the groups who oppose the use of biotechnology.

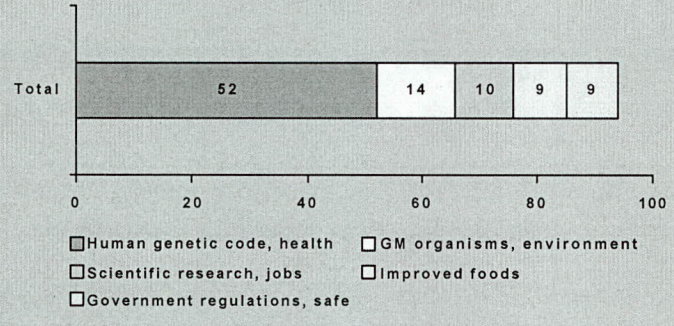
In general, the survey suggests that the positive messaging was stronger than the negative messaging. The focus groups produced a more nuanced set of findings:

- Positive messaging around health and the environment is much stronger than positive messaging around economic benefits, food safety or regulatory strength.
- Views have polarized to the extent that those who oppose biotechnology or are deeply uncertain will not believe or accept the positive messaging.
- There are some negative messages that are strong – growing resistance in pests to pesticides and the possibility of genetic contamination. The staying power of the cockroach and the pesticide resistance of mosquitoes are often-cited examples.



Strongest Argument in Support

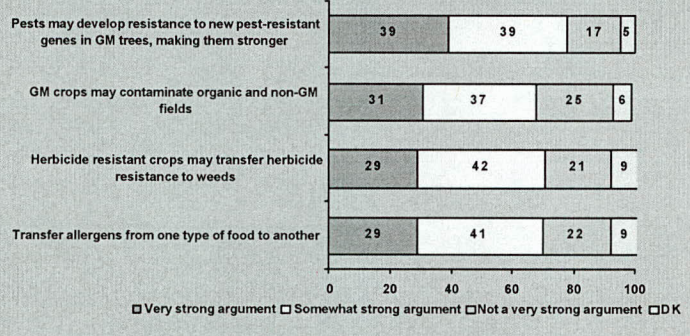
Which of the statements above is the strongest argument in favour of the development of biotechnology?



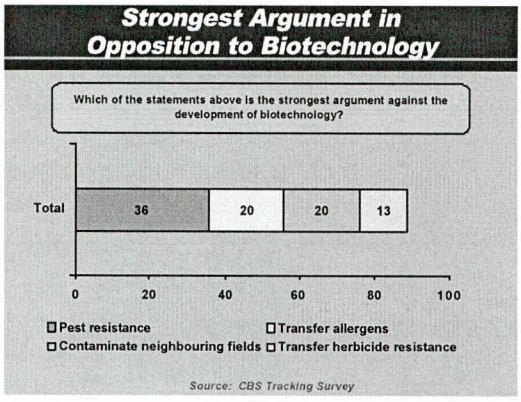
Source: CBS Tracking Survey

Arguments in Opposition to Biotechnology

I would like to read you some statements in opposition to biotechnology. In each case, please tell me if in your view, the statement is a very strong argument, a somewhat strong argument or not a very strong argument.



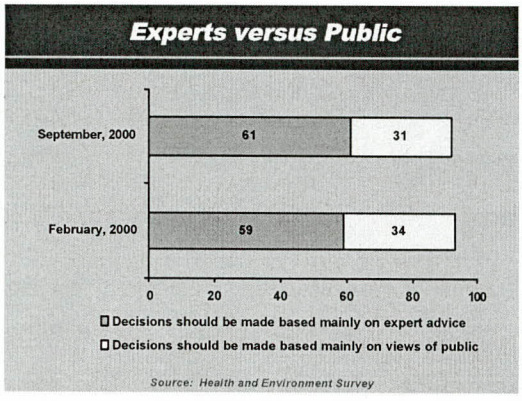
Source: CBS Tracking Survey



INVOLVEMENT

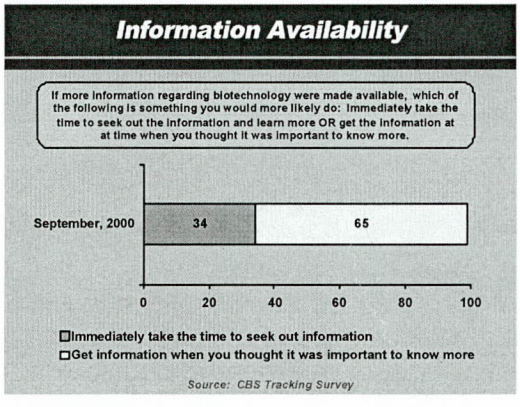
Once again, the survey and focus groups suggest that the public believes that experts should be the decision makers about the safety of products. Most would not want to participate in decision making or consultation sessions but they want to know they are being conducted and that people of sufficient expertise are attending. However, as indicated earlier, individual choice is still a powerful driver in the marketplace itself. That means most people do not want any superintending body or organization to make decisions on product availability based on social or ethical grounds. Most people say only individuals should make those decisions for themselves. The clear exceptions where they believe government has a role to play are:

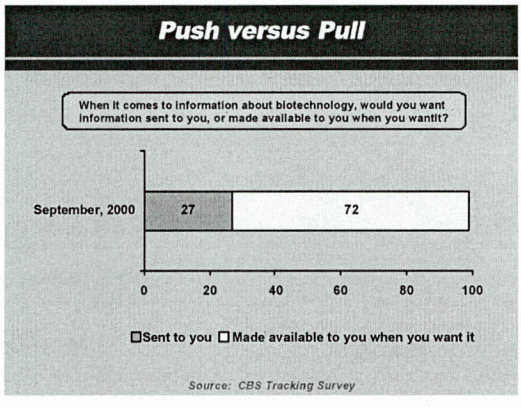
- Safety, science and regulation
- Genetic privacy
- Patenting



INFORMATION

And yet again, this wave confirmed that most people want neutral, accessible information on biotechnology to be available. The fact that information is freely available seems sufficient to convince most that there is no hidden agenda; transparency seems to indicate that government is properly motivated and committed to informing citizens. However, as has been found consistently, most people don't want the information sent to them (or "pushed") – they want to be able to access (or "pull") it when they feel the need.





POLLARA AND EARNSCLIFFE

Focus Group Findings

A. INTRODUCTION

Similar to the quantitative research program, two separate, but closely linked, qualitative research studies were carried out as part of this initiative. One of these focused on tracking many of the core issues investigated in the first two waves of research into biotechnology issues. The other focused chiefly on the regulatory system and issues of scientific inquiry that surround biotechnology. Accordingly, some of the issues are addressed with a view to tracking trends over time, while others are being investigated for the first time. In the interest of clarity and brevity, results of these two qualitative research programs will be outlined in this section of the report. These findings summarize the results of 20 focus groups conducted over a two-month period across Canada.

B. AWARENESS AND FAMILIARITY

1. **Top-of-mind awareness of biotechnology has grown significantly over the past year, especially among Involved Canadians[1].** Extensive media coverage of this issue has broadened awareness levels – Involved Canadian respondents in most groups can cite specific articles and news stories that they have recently read or viewed on this issue.

2. **The growth in awareness still has not catalyzed widespread engagement, although more Involved Canadians have discussed the issue with others in recent months.** The majority would classify themselves as casual observers, rather than active followers or disinterested. Virtually all of the Involved Canadians would classify themselves as at least casual observers of this field.

3. **Most people associate biotechnology with health and medical benefits, or with GM food. Some also associate biotechnology with the stock market, and its potential as a growth industry**. In general, initial associations tend to be a barometer of deeper attitudes toward biotech.

[1] *Involved Canadians*: Earnscliffe Research and Communications' proprietary population segmentation of Canadians who are significantly more interested and involved in public policy issues.

Those that initially cite health or medical benefits tend to lean positive in their outlook toward the technology. Those that tend to initially cite GM food applications tend to lean negative. There remains virtually no awareness of forestry applications or environmental applications like bio-remediation.

4. **A "polarization" of attitudes on biotech appears to be emerging, with notable growth in the number of respondents who hold strongly favourable views.** Previous waves of research indicated that most people were mildly positive toward biotechnology, with only a handful of strong advocates, and a core of 15-20% who were strongly opposed. The results of these focus groups suggest that the core of opposition remains about the same, but that a group is forming at the opposite end of the pole, as strong advocates of biotechnology. In the middle tend to be people who have some trepidation, but are on the whole mildly positive toward biotechnology. **To provide a rough breakdown of overall sentiments, about 80% of the focus group participants agreed with the statement "overall, the potential benefits of biotechnology outweigh the potential risks," while about 20% disagreed, believing that the potential risks outweigh the potential benefits.**

5. **Different types of language used to describe this field evoke profoundly different attitudes. Reactions to the words "biotechnology" and "genetic modification" differ significantly.** *Genetic modification* has an almost universally negative connotation. It tends to be viewed fairly narrowly, linked most directly to ideas of eugenics and the manipulation of human genes. It is a term toward which many, especially those who are less aware of the issues, react quite negatively. In contrast, *biotechnology* is a term that is broader, more inclusive of a range of applications, and generally connotes positive attributes, although those who are strongly against these technologies feel similarly about both words.

6. **As respondents become more aware of biotechnology, attitudes tend to be more mixed**. As awareness grows, respondents are less willing to make blanket assessments (either positive or negative) about biotech writ large. Views become more nuanced, and often come with qualifications. **However, higher levels of awareness do not necessarily correlate with higher levels of concern or negativity toward biotechnology.** In discussion, it frequently becomes evident that most people are torn in their views toward biotechnology, arising from a degree of internal tension about the issues involved. Over the past year, survey and focus group work indicates that

views have become more moderate rather than moving to outright support or opposition.

7. **Most had little idea about federal government roles or responsibilities, or what the regulatory system consisted of.** Similar to the food-testing issue discussed above in the Detailed Findings, most assumed that some type of regulatory framework was in place, and that there was probably some form of economic support in the form of R&D incentives. However, many expressed concern that government cutbacks had eroded the effectiveness of both the regulatory system and the support system.

8. **There remains little knowledge of the breadth and extent of the Canadian biotechnology industry, although the growing role of biotechnology in the stock market is fuelling a sense that this will be an important industry in the future.** Most people could not identify any Canadian companies, nor could they estimate the size of the industry and its relative importance to the Canadian economy. Nevertheless, the attractiveness of the high technology paradigm leads most to believe that Canada should try to assume a leading role in biotechnology, though they wonder if the country has the money and expertise to be fully competitive internationally. That being said, many were reluctant to assign a significant role to the federal government in this area, viewing this as something for the companies themselves to focus on, and something that is not government's strength.

9. **In British Columbia, people were more aware and engaged than in any other part of the country, and tended to be more polarized in their views.** As previous research has suggested, GM food is a touchstone issue in that province, with a fairly large segment of the population actively engaged in the purchase of organic food (for its own sake as well as to avoid GM ingredients). Demands for mandatory labeling of GM foods were strongly voiced in all of the BC groups, to a much greater extent than in other parts of the country). The perceived lack of government action on labeling was a signal to a significant number that the federal government was not adequately fulfilling its safety and regulatory obligations to Canadians.

10. Women tend to express higher levels of internal tension about these technologies than men, tending to 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.

C. APPLICATIONS

1. **Consistent with previous research, participants expressed a range of views about biotechnology product applications.** Some applications were universally acceptable, while a significant number of applications created divisions of opinion among the respondents, and some were rejected outright. Health and medical applications are the most widely acceptable, applications related to GM food products the least. Applications that promise environmental benefits generally fare well, although in several groups respondents questioned the impact of these applications on biodiversity and the surrounding ecosystems.

2. **Acceptance of biotechnology applications is most often 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 provide.** Conversely, if there is no compelling public purpose rationale for the application, participants often reject the application. 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 the possible exception of health products, where support has grown and become nearly universal.**

3. **In the end, the framework for analysis that most people use is 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 basic risk-**

benefit equation (benefit – risk = X). If X is negative intuitively, people will suggest that the application is unacceptable to them.

D. ROLES AND RESPONSIBILITIES OF THE FEDERAL GOVERNMENT

1. **For the most part, top-of-mind impressions are that the federal government probably has some regulatory role in the field of biotechnology, but virtually none of the respondents in any of the groups had any detailed sense of what that role might be.** 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. When asked to guess, most assumed that there would be government scientists involved in studying the effects of products. Only a handful of respondents suggested that the federal government plays a support role to the biotech industry. For the most part, when this industry support role was discussed, some respondents expressed concern about how effective this role was – there was a widespread feeling that government does not have strong capacities in this area. Among those who were generally predisposed to be negative toward biotechnology, strong concerns were raised about whether any economic role the government would be involved with would be unduly influenced by corporate interests.

2. When prompted about what federal departments might have responsibilities in this field, respondents most frequently cited Health Canada, although more than half were not able to name a department or agency that might be involved. A few respondents suggested that there is a federal agency responsible for food safety (none named the Canadian Food Inspection Agency (CFIA) directly.) Environment Canada was only mentioned by a handful of people as an agency that might have responsibilities on this file.

3. **Although few could say whether the federal government was doing an effective job or not in this area, the first instinct of most respondents was that it might not be,** due to a couple of factors. The most prevalent of these was a general sense of malaise about government and political leaders, and their inability to make effective decisions. Upon further discussion, a number suggested that the fact that Canadians were unaware of what the federal government's responsibilities are was a signal about the effectiveness of the job it was doing. The lack of public knowledge indicates to some that the government may have something to hide, either because it does not know

what is going on or it does know and is "afraid" to tell Canadians the truth. Also, a significant number expressed concern that government cutbacks had eroded the effectiveness of the regulatory system, particularly with regard to Environment Canada.

4. A number of respondents suggested that this lack of knowledge about what roles the federal government has and which departments have them represented a central reason why they are concerned about biotechnology. **In short, there is a prevailing view that these technologies are moving forward without any sense that the risks are being considered, let alone managed by the federal government.**

5. **However, when presented with a question about whether they feel safe about health and/or food products and the 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. Most did not have a strong sense about how effective regulatory or safety systems at Environment Canada were. **The consensus position among virtually all focus group participants is that the regulatory agencies and scientists at Health Canada in particular are doing as well as can be expected, given the current level of scientific knowledge of the risks, and the current level of resources dedicated to these purposes (which many feel is probably not adequate at this time).**

6. **The contradiction in attitudes between the "regulatory process/safety of products" and perceptions of government effectiveness is fuelled in part by the extent of reference to "government." When "government" is raised, first reactions are almost universally negative, and usually linked to politics and politicians. Systems for safety and regulation at Health Canada and to a lesser extent the CFIA are seen to be less "political" in nature. They also have positive reference points for outcomes of these processes such as safe drugs, safe food.**

7. Most assessments about approval processes are not made based on any specific information people possess about biotechnology. Rather, they are based on assessments of other related activities of those departments or agencies.

- **The positive assessment of Health Canada is a product of a number of positive reference points.** Some suggested that Health Canada has rejected products like Olestra that other countries have accepted, indicating higher safety standards; others suggested that Health's drug approval processes take longer than the United States, reflecting higher standards and more comprehensive testing; still others point to the fact that Health Canada is now testing health food products as an indication of a high level of concern about product safety.

- **The moderately positive assessment of CFIA has less to do with specific reference points, but rather it derives from a general sense that food on grocery store shelves is safe.** Many people believe food is safe, and rarely hear about problems with the safety and testing system, so their instincts are that the system probably works reasonably well. There are some, however, that have serious concerns about the food approval process – again, these tend to be individuals who are most concerned about GM food. Among these people, the lack of labeling of GM food suggests that corporate interests are forcing agencies like the CFIA to neglect its public interest role in food safety.

- **The mixed assessment of Environment Canada is largely a product of a lack of reference points for specific initiatives and positive outcomes associated with the department.** Indeed, many among the general population suggested that their only reference point to Environment Canada is the weather. Some suggested that Environment Canada isn't very good at predicting the weather, and therefore might not be all that good at evaluating biotechnology products. Others, mostly Involved Canadians, hold more positive views of Environment Canada, although they aren't able to cite a lot of positive reference points either. For example, irrespective of the fact that Environment Canada did not have an oversight responsibility in Walkerton, the e.coli tragedy was cited by some people as evidence that Environment Canada might not be up to the task of properly monitoring and evaluating biotechnology products.

8. **There is a widespread sense that Canada's regulatory and safety system, particularly in the area of health, is probably more comprehensive than that of other industrialized nations.** Most often, these views are not based on any knowledge about standards and practices regarding biotechnology, but on positive associations with safety on other issues.

9. When a brief overview of the regulatory approval processes for GM food and GM health products was provided to respondents (see the Health and Environment Moderator's Guide, for detail), **the majority (roughly three out of four) were pleasantly surprised at the comprehensiveness of the actual regulatory approval processes, and were reassured by the information.** However, a significant number, about three in ten (higher in British Columbia), raised questions about the approval process. The most disconcerting aspect for them was the fact that biotech companies conduct the bulk of the scientific research. Perceptions were that this research could be "fudged" by the companies in order to make products appear safe that might not be. These people were also likely to question the government "standards," and wondered whether government was capable of uncovering fudged research data in its evaluation process. **When asked what might make them feel more confident in the regulatory approval process, a very consistent result emerged: 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 the company research.**

10. Only a handful of respondents know the industry support function that the federal government plays in this field. Although many believed that this was an area that was worth the attention of government, many raised concerns about how this role would work in practice. One of these concerns involved the role of politics and patronage in decision making. There is a widespread sense that politics plays a substantial role in government decision making in these areas, 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 would be best carried out as sector-wide programs (like R&D tax credits) rather than targeted programs.

E. PRIORITIES FOR THE FEDERAL GOVERNMENT

1. **Priorities for the federal government were clear and have been very consistent over all three 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 that long-term ongoing study of potential health and environmental impacts of these products is being done.** Many participants (especially those who tended to be more negative toward biotechnology) indicated that an additional key to the sanctity of the regulatory system was the insulation of this system to the greatest extent possible from corporate influence.

2. At the same time, **strong messages were heard from many respondents, particularly Involved Canadians, that government should not try to do all of the work internally, that it should partner with individuals and organizations at universities in Canada and internationally.** 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 important than health and safety regulations and research. Of note, there is a small core (who initially express negative views toward biotechnology and GM products) who express fairly strong resistance to the idea of government supporting biotech companies. In the words of one of these respondents in Brandon, Manitoba: "Why does Monsanto need government help? *Government* needs help to *fight* companies like Monsanto."

4. In terms of the regulatory division of labour between federal departments, most did not have strong feelings, but among those who did, the consensus position was that each department (CFIA, Health, Environment) should continue to carry out its respective functions in its areas of expertise, and collaborate to ensure coordination of standards across the departments. While this is notable, perceptions of Health Canada's practices tend to be stronger than the others, so if there is one agency that would be provided with leadership responsibilities on this aspect of the biotech file, the one that Canadians would probably have the most confidence in would be Health Canada.

5. **A fairly universal consensus also emerged that GM products are different than other products, and should be subject to higher standards, and more comprehensive research and testing.** With regard to GM food, "substantial equivalence" was generally not seen to be the most appropriate standard for testing. Most felt that GM food should be subject to longer, more stringent testing procedures before being made available to the public. With regard to other products, particularly health products, there were mixed views. Concerns were raised about longer testing procedures for GM health products given the importance that some of those products might have in saving lives. The difference is a function of perceptions regarding the marginal benefit of these products. GM foods were not seen to be crucial to public or environmental health, so the general consensus was that it was better to err on the side of prudence when testing them.

6. **A very strong consensus emerged in the focus groups that the federal government should make it a priority to collaborate with other countries on biotechnology, particularly in the areas of safety and regulation.** Participants widely believe that it is impossible for Canada to go its own way regarding technologies like this, and the best way to ensure safety and to ensure that benefits are reaped is to be involved in the subject at an international level. Although none had heard of it, when briefly described the Biosafety Protocol was widely seen to be a step in the right direction for the federal government.

7. **There was continuing broad support for a two-track policy approach, including a strong regulatory and scientific oversight system in addition to fostering the development of the industry.** Beyond the 10-15% who are opposed to the technology and very concerned about industry influence, participants had no problem with government playing dual roles (many say that is what they *expect* government to do), as long as the regulatory system could be insulated from economic pressures. Ideally, Canadians would be most comfortable with the system's effectiveness if those functions were carried out by separate departments.

F. RISKS AND DECISION MAKING

1. **Most participants understand that the development and use of biotechnology applications carry risk, and are prepared to accept those risks in cases where the potential benefit merits taking a risk.** 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. For example, growing kidneys in laboratories for transplantation was found to be acceptable by a wide majority of participants, in spite of the fact that it entails the manipulation of human genes. Conversely, the creation of a tomato that can last longer on store shelves or looks more appealing was deemed to be unacceptable by the wide majority of respondents. **This acceptance of taking risk is more prevalent than found in previous waves of research. It is bound to a strong sense that progress cannot be achieved without calculated risks being taken.**

2. **With the exception of the core group of individuals who are strongly opposed to biotechnology, the vast majority believe that science should be the primary guide to decision making about biotechnology applications.** Again, consistent with previous research, people do see biotechnology as having moral or ethical dimensions, but for the most part, health and environmental risks are the key drivers. Ultimately, if an application is deemed safe by the "best available" scientific research, most say that this is the best that we can expect. This is not to say that the "best available" scientific evidence would make all biotech products acceptable, rather that science is the most effective means to abate perceived drawbacks.

3. **While it was strongly asserted initially that moral and ethical issues should play a role in decision making, there was no consensus about how that might be operationalized in the decision-making processes of the federal government.** Upon further reflection, many pulled back from this position, asserting that government should resist making moral and ethical decisions on behalf of society. In many of the groups, further discussion about how these considerations should be integrated into decisions produced a "minimalist" role for government in this area. Where there was a clear societal consensus about a particular application on moral grounds (e.g. cloning) participants accepted government taking a strong position. In "grayer" areas, most felt that decisions had to be made by individuals, after being provided with the information necessary to make an informed decision.

4. **In terms of who should make decisions about biotech products, there were some fairly substantial differences of opinion, particularly between members of the general public and Involved Canadians.** Among the general public, the dominant view is that they themselves do not have the knowledge or ability to make effective decisions, and that experts (scientists, university researchers, government researchers and policy makers) are much better placed to make these kinds of decisions. Among Involved Canadians, there was a much stronger sense that individual Canadians should be involved in decisions. Where there was agreement among the two audiences was about the decision-making process – Canadians do not like the idea of decisions like this being made "behind closed doors." Ultimately, for the majority of Involved Canadians, informed choice is the preferred option. That is, beyond safety, the government should make products available and allow individuals to make their own decisions about biotech products. For the general public, expectations are that the government should take on a stronger role in the public interest, and ban things that may be socially or morally unacceptable.

G. GM FOOD

1. **Consistent with previous waves of public opinion research, the GM food debate has not catalyzed opinion very deeply in most of the centres, although it continues to be of substantial concern in the lower mainland of British Columbia.** In Vancouver and Victoria, the public was more engaged, and tended to express higher levels of concern about GM foods and their impact. In these groups, the negativity surrounding GM food was found to have an impact on overall views toward biotechnology and, more specifically, on government's ability to manage it. There was a broad consensus in these groups (both general public and Involved Canadians) that the fact that mandatory labeling had not occurred suggested that the government was either incapable of properly managing safety or unwilling to run against corporate interests on this file. These perceptions significantly undermined overall credibility.

2. **As discussed above, consistent with the previous waves of research, most people believe the food on grocery shelves must be safe and has been tested by government. However, there is widespread confusion between testing and inspection.** Upon discussion, participants often became less certain about the safety of the food system the more they thought about it.

3. **In contrast with previous waves of research, many were not surprised to hear about the actual proportion of GM ingredients in processed foods.** Members of the general public usually resigned themselves to assuming that this was and is inevitable. Others, particularly Involved Canadians, were upset about the extent of penetration that products with GM ingredients have in the processed food sector.

4. **Most people advocate an "informed choice" approach to GM foods, and that leads to labeling.** As long as the science is sound, most people feel that the purchase of GM food should be up to each individual. Many accept voluntary labeling as a reasonable step. Others, primarily Involved Canadians, tend to lean toward mandatory labeling as a preferred solution.

5. **There is little evidence that negative attitudes toward GM food inherently "spill over" and affect attitudes toward other types of GM applications.** As discussed in the Applications section above, most people conduct a case-by-case assessment of each type of application, assessing them on their own individual merits. It should be noted, however, that among the core group of strong opposers of the technology, the same types of risk considerations are cited as reasons why other applications are opposed.

H. GENETIC PRIVACY

1. **If these focus groups are any indication, genetic privacy may be a potential catalyst that drives public engagement on biotechnology.** Very strong opposition was raised against the use of genetic information by insurance companies as well as employers, and opposing arguments had little impact on views. Most felt that the idea of individuals being granted the right to submit their own genetic information for advantage was simply an "end run" of the insurance companies' receiving the right to ask for it, the final result being exactly the same (people excluded from the insurance system). As for the "moral hazard" argument that people would sign up for insurance if

they knew that they had some genetic predisposition to disease, many saw this as a legitimate consideration but not a strong enough one to bend them on the idea of insurance companies having a right to access this information. The preferred solution was to provide insurance companies with fairly wide powers of investigation into fraudulent uses of genetic information.

2. **The idea of allowing scientists or companies to have access to Canadians' genetic information in order to study genetic traits and develop cures for illness was only supported under certain circumstances.** Participants expressed some fairly strong reservations about how this information would be used, and whether corporate interests would use this information to make money. With certain caveats, use of this information would be acceptable, chief among them being that the individual must consent to their genetic information being used. Secondly, respondents felt strongly that this research be "blind," ensuring that the individual's name is de-linked from the genetic information.

I. PATENTING

1. **The results of this wave of research indicate higher levels of support for the idea of patenting genes than previous research has shown. In previous waves, many were torn and confused by the patenting issue, and, on balance, most suggested that patenting should not be allowed. However, as a result of greater awareness of biotechnology, Involved Canadians appear to have heard more about the idea of patenting, and have begun to consider the pros and cons more carefully. The main concern that people raise regards access and affordability. This concern is expressed as follows: patenting means higher prices for products, so some people won't be able to afford them. In most groups, discussion eventually led to a majority leaning toward allowing patenting, although under revised rules**. Among these qualifications were a shortened patenting period for biotech products, and a ban on patenting human genes. In addition, many suggested that case-by-case decisions had to be made, with consideration of the extent to which the application created something new (generally deemed more acceptable) or described a process that already naturally occurred (generally deemed much less acceptable).

2. Only a handful of respondents had heard about the Harvard mouse case, but the vast majority were in support of the government's position, based on the rationale that the current Patent Act was being interpreted too widely, and more importantly, that the Canadian Biotechnology Advisory Committee (CBAC) had not yet completed its work to collect the input of Canadians on this issue.

J. PUBLIC INTEREST AND INFORMATION

1. Public expectations about the delivery of information on biotechnology have not changed significantly since the last wave of research was conducted. **The main factor contributing to consumer confidence in the process is transparency about safety and the regulatory approval process.** Most people don't necessarily want to see or read all the information but they want to know that it is easily accessible, and that they can retrieve it whenever they want. **The availability of information implies that the process can be trusted and inspires confidence.**

2. **As such, most people would not endorse a government advertising initiative on biotechnology or GM foods. They see this as an unnecessary expenditure. However, there is a strong desire among most people to have access to information about the government's role in this area should they want it.** Most participants would like to see a biotechnology web site and/or a registry where they could sign up for updated material to be sent or e-mailed. There is also a willingness to see information brochures placed in supermarkets.

3. **Most importantly, participants were interested in receiving information that was "neutral," that would explain both the potential risks and the potential benefits of biotechnology products, and how government intended on managing those risks.** They do not want government to strongly advocate only one position; they would like government to play an objective role. **There was also a strong demand for information at any level of detail a person might want, starting with a very basic overview of the field, some of the issues involved, and some of the basic roles and responsibilities of the federal government.** The Involved Canadian

groups responded more positively to receiving factual information on the approval process for GM products, and having access to research studies that inform the regulatory process.

4. **Public consultation is often asked for, but few say they would participate. Consistent with previous research, this demand is driven by a sense that consultation implies government openness.** Most people say they would not personally participate in town halls or consultation sessions, but they do want them to be mounted. Generally, they believe more expert people would participate and that was all to the good. As the survey indicated, most members of the general public are content to allow experts to sort through the issues as long as they can find out what happened and have access to information if they require it.

K. MESSAGING

1. **Consistent with the previous research, messaging or arguments that focus on health or environmental benefits are much stronger than those that promise to expand the food supply or convey economic benefits to individual producers or the economy as a whole.** On the negative side, it is the argumentation about upsetting the ecosystem balance that has the most impact, especially the ability of certain pests to grow stronger (or be eliminated altogether) as a result of pest resistance modified into trees and crops.

2. **On the whole, the negative messaging is powerful (more powerful than previous negative arguments, which tended to be thin on specifics). However, the positive messaging surrounding health and environmental benefits is stronger. This kind of messaging taps into people's underlying sense that biotechnology may provide society with incredible medical breakthroughs. Nevertheless, the positive messaging will not have nearly the same level of impact unless messaging about the federal government's commitment to stringent safety standards and dedication of energy to those ends are outlined.**

3. **On GM food applications, there remains virtually no way to create positive messaging around them. There is only the prospect of trying to convince people that the safety system they have passed is stringent, and that ongoing research will continue to be done on these products.**

GM food labeling remains a very powerful issue, and a very significant concern, especially among Involved Canadians. Largely, participants were nervous about any kind of additives to food and chemicals used to increase yields and do not easily distinguish them from GM ingredients. The fact that GM foods might offer health and cost benefits in the medium term had some, but only minor, positive influence on views. Messaging that includes these aspects is unlikely to sway sentiment.

4. **There remains widespread distrust of a variety of institutions and potential spokespeople on all sides of the debate.** There are few voices people would believe to be completely trustworthy in providing information about biotechnology.

   - On a government level, there was widespread mistrust of politicians and senior civil servants. In addition, there was concern about the basic competence of government officials to fully understand and manage risk. The only people in government that were deemed to be relatively trustworthy were officials involved in regulatory processes. Government scientists were by far the most trustworthy representatives of government, but fears of corporate and political influence led many to question the ability of these people to provide credible information to Canadians.

   - Business was widely perceived to be in a conflict and would be expected to extol products out of self-interest. There was generally higher levels of mistrust of business (the biotech industry) in this wave of research than in previous waves. This was certainly the case in western Canada, where the Schmeiser case with Monsanto is well known.

   - Scientists in general were regarded with some suspicion because most believed the scientists were too heavily influenced by potential funders of research. Curiously perhaps, participants tended to differentiate between scientists and university academics, who they felt were the most independent in the scientific community.

   - Interest groups continue to be a source of deep suspicion among Canadians. They tend to be regarded as uni-dimensional and, in some cases, radical. People tended to believe that interest groups always represented one side of a debate and were not to be trusted to provide dispassionate or even credible views. Even in British Columbia, environmental groups were regarded with low levels of credibility.

- **The most trustworthy spokespeople were those identified as having independent status and no obvious benefit to gain.** That was the basis for accepting the word of university academics. Others that fall into that category are doctors and hospital researchers. Of note, participants felt that independent advisory boards (like CBAC) carry credibility as information sources on biotech. **Most people were willing to accept the word of expert panels or advisory boards as long as they were clearly at arm's length from government and industry.**

Secondary Analysis

The final component of this research program involved a secondary analysis of public opinion research on biotechnology, conducted by other research organizations in Canada, the United States, and Europe. This secondary analysis of existing data was completed with the objective of adding depth to the qualitative and quantitative research, and to provide a comparative perspective on opinion trends occurring in other parts of the world.

As a preface to the analysis, it is important to note that the current body of publicly available public opinion research on biotechnology remains remarkably small, and among the studies that have been conducted, most focus directly on a handful of specific issues, rather than a broad spectrum. As such, several of the sections below consist of only a few points of data, while others consist of data drawn from numerous studies. Where appropriate, the discussion will outline how these other pieces of research compare and contrast with Earnscliffe's findings.

The following pieces of research were accessed for this secondary review:

- Ipsos-Reid, August 2000, sample of 1500 (Canada)
- Environics (on behalf of Health Canada), June 2000, sample of 1200 (Canada)
- International Food Information Council, April 2000, sample of 1000 (Canada, U.S., Europe)
- MORI Research (on behalf of the Human Genetics Commission), November 2000, sample of 1000 (United Kingdom)
- Consumers Association of Britain, July 1999, sample of 1900 (United Kingdom)
- North Carolina State University, 3 studies, January-July 2000, samples of 1000 (Japan, U.S.)

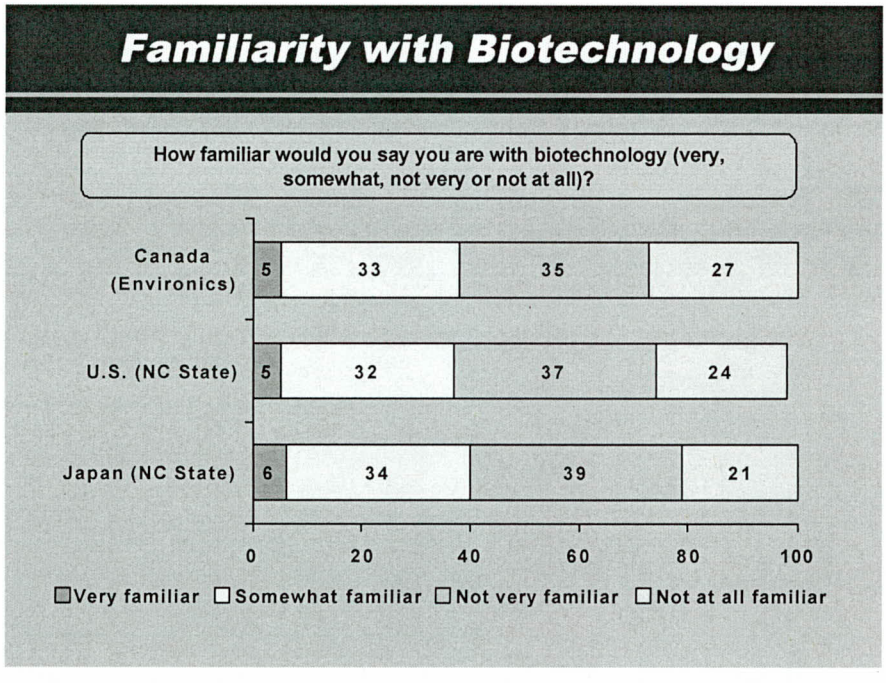
POLLARA AND EARNSCLIFFE

A. AWARENESS AND FAMILIARITY

All of the studies investigated levels of awareness of and familiarity with biotechnology. **Consistent with previous work in this area, awareness levels are quite low, not only in Canada, but worldwide.**

The Environics study found that only 38% of Canadians self-identified as being at least "somewhat familiar" with biotechnology, and only 5% suggested they were "very familiar." These results are very consistent with Earnscliffe's data.

The NC State University studies suggest that in Japan and the United States, levels of awareness and familiarity with biotechnology are about the same as in Canada. In Japan, four in ten said they were somewhat familiar with this field, while in the United States, 37% provided the same answer. In all three countries, at least six in ten respondents say they are not very or not at all familiar with this field. All told, the available data suggest that across these nations, citizens have relatively low, and roughly equal, levels of awareness and familiarity with the topic.



B. QUESTION OF RISK

All of the studies included in this investigation placed substantial emphasis on questions surrounding risk. Previous studies have found that citizens have some trepidation about biotechnology – a sense that though some good comes of it and that it may be inevitable, there could be some associated dangers.

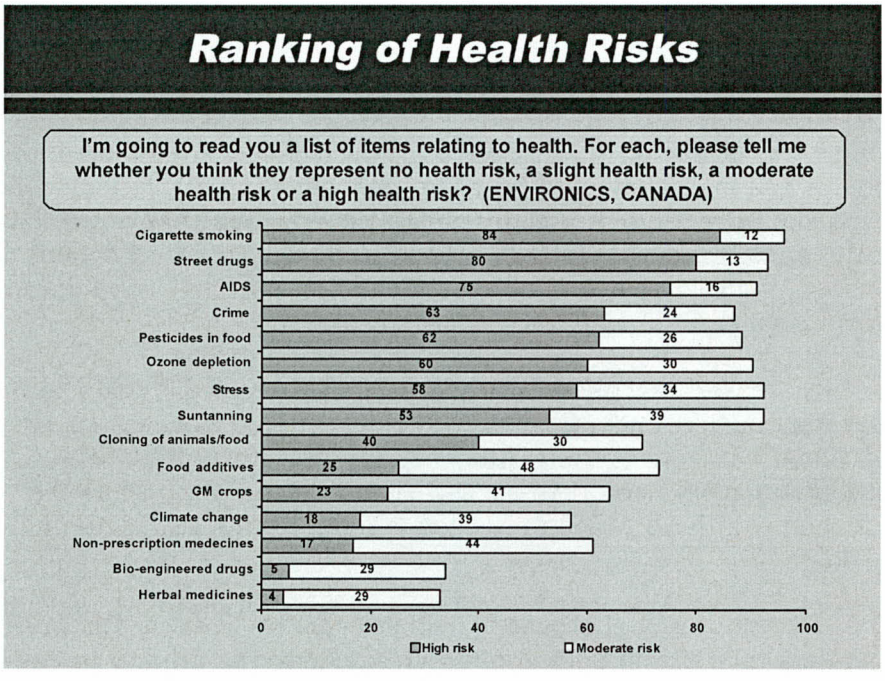
Environics' survey investigated several dimensions of issues associated with biotechnology risks among Canadians. First, they investigated overall perceptions of risk in society, and how the risks associated with biotechnology compare to risks posed by other factors affecting individuals. This provides the observer with a relative assessment of how biotech risks "stack up" against other risks in society, enabling us to further understand how pressing these risks are in the minds of Canadians.

In all, Environics asked respondents to rate 27 health-related risks. The results yielded several notable findings. First, Canadians have become much more concerned about health risks around them. On most of the tracking questions, perceptions of risk have risen dramatically. Among these, the factors that have risen most sharply include AIDS, pesticides in food, cigarettes, bacteria in food, and street drugs.

So where do biotechnology applications fit in this ranking of risks? **According to Environics data (see graph below), biotech applications tend to be found in the second and third tier of risks, behind those listed above as well as risks such as "stress," "suntanning," "crime," and "ozone depletion." Biotech applications that fit in the second tier of risks include food applications, such as cloning animals for human consumption, GM crops, and pesticides that consist of GM bacteria.** For Canadians, these applications pose about as much risk as things like bacteria in food, non-prescription medications and climate change.

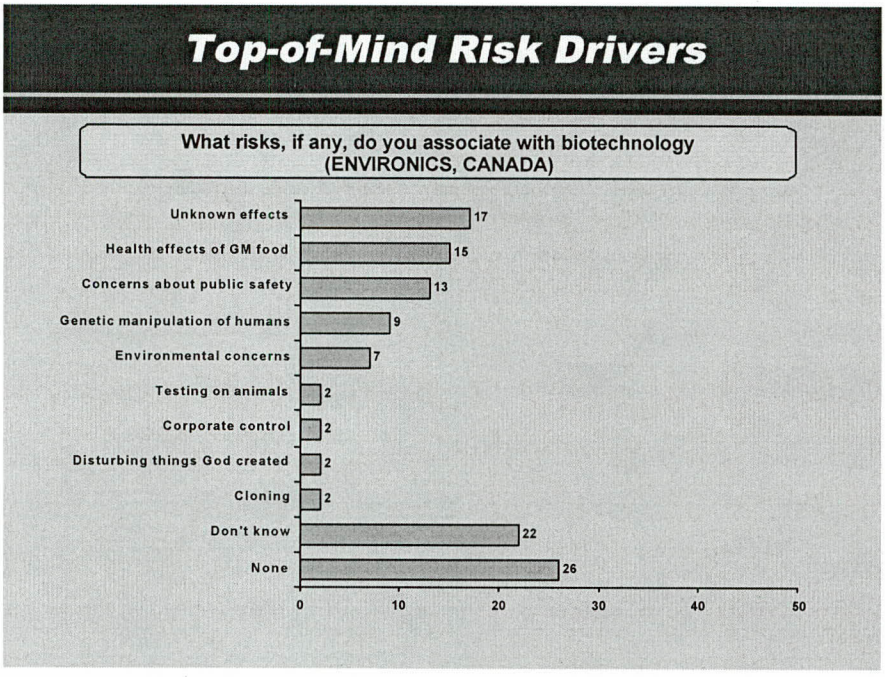
As the graph also illustrates, biotech health and medical applications are found in the lowest tier of risks, along with things like prescription drugs, medical x-rays, pacemakers and tap water.

As a whole, this data suggests that risks posed by biotechnology in its most prevalent forms are perceived as significant, but are not among the most pressing for most Canadians.



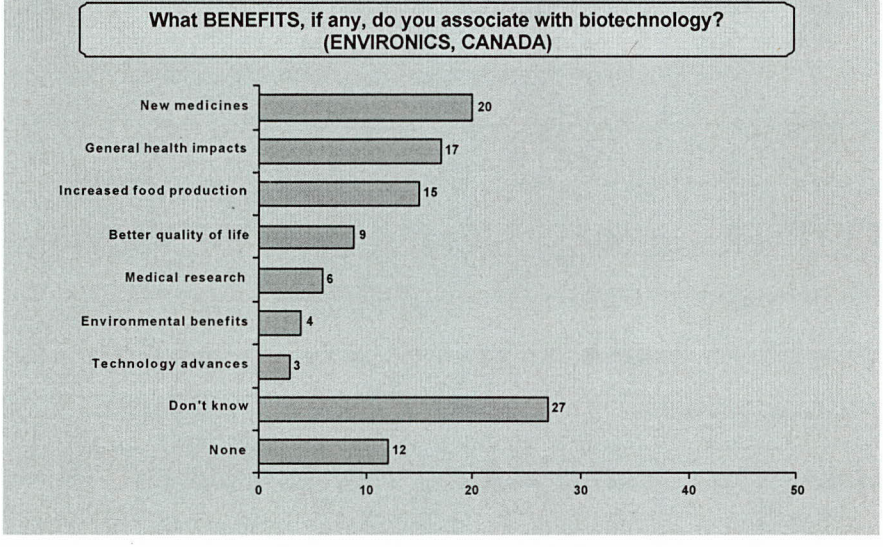
Respondents to the Environics survey were asked to provide a top-of-mind identification of what "risks" are most associated with biotechnology. The results revealed that many Canadians don't know enough about the subject to identify any specific risks. **Among those that could identify risks, the two most cited concerns were unknown effects/impacts and potential health risks associated with GM foods.**

Earnscliffe's research also suggests that these two risks are the most widely disconcerting to Canadians. We would also suggest that the inability of many to identify risks is due to a lack of knowledge of the subject, rather than a sense that there may not be many potential risks involved with biotech. In focus group discussions, with a relatively small amount of prompting, respondents are quickly able to cite many disconcerting risks, chief among them long-term impacts on health and the environment.

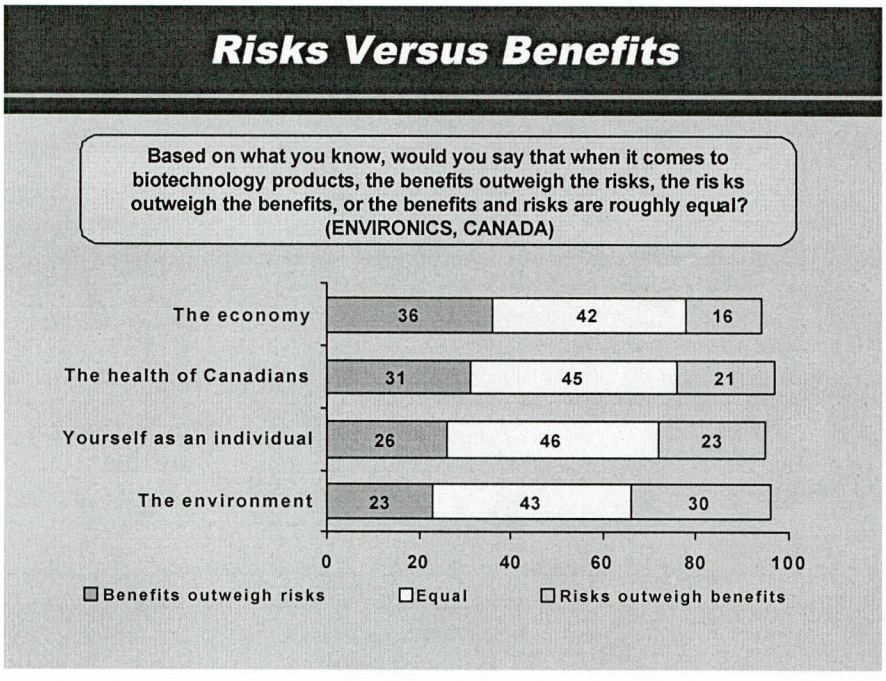


Unaided top-of-mind identification of "benefits" associated with biotechnology also yielded a substantial number of "unknown" responses. We would suggest that lack of awareness is the main driver of this set of results, similar to what was found when respondents were asked similar questions about risks. However, **among the benefits that were cited, health benefits dominated. New medicines/cures and other health benefits were the most widely identified, followed by increased food production though GM food.**

Top-of-Mind Benefit Drivers



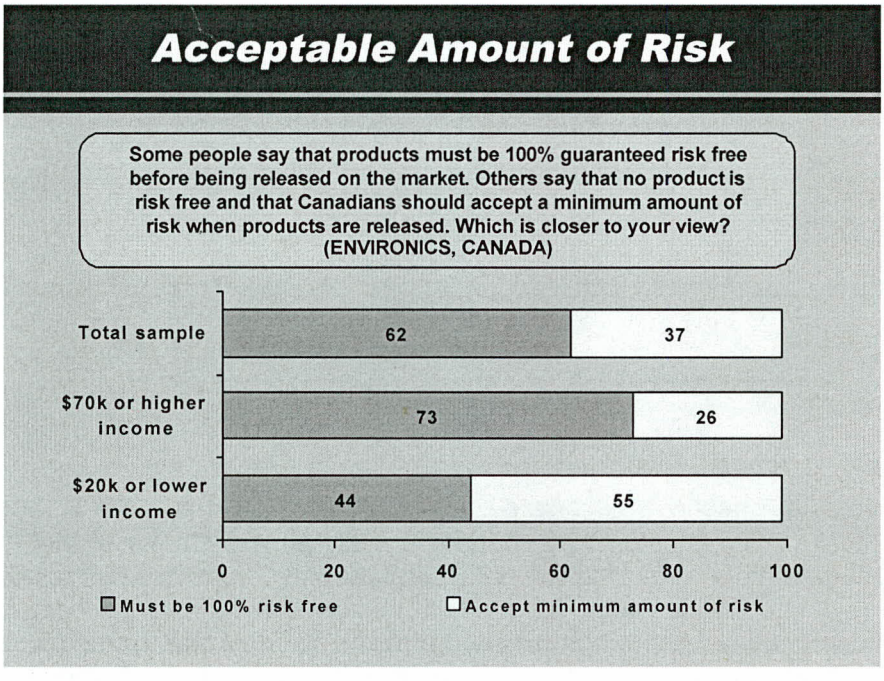
When respondents consider risks and benefits of biotechnology in combination, Environics' research suggests that perceptions of the balance of risks and benefits differ substantially depending on whether the individual, the society, the environment or the economy is the focal point of the assessment. Canadians are more than twice as likely to suggest that for the economy the benefits outstrip the risks, whereas they are more likely to say that the risks outstrip the benefits when it comes to the environment. For them as individuals, most feel that on balance the risks and benefits of biotechnology will be relatively equal.



Consideration of questions associated with risk hinge on the issue of whether any risk at all is acceptable to the public. The previous sections of this report have investigated this issue in some detail, and the Environics survey contributed to this body of knowledge with a question about what level of risk is acceptable, a forced choice between ensuring that any product placed on the marked is 100% risk free versus accepting that no product is risk free and Canadians should accept a minimal amount of risk when products are released.

The results of this question suggest that a majority accept that there are risks inherent in any product, and that potential risk does not automatically create unwillingness to allow a product. Sixty-two percent of respondents agreed that no product is risk free and that people have to accept a minimal amount of risk; 37% said that they expect products to be completely risk free. Interestingly, there are some notable socioeconomic differences on this question. The graph below illustrates that among lower-income Canadians, expectations of 100% risk-free products is much higher than among higher-income Canadians, where three in four say they accept some level of risk.

Considering the results of this question in light of the other research found in this report, our analysis is that most Canadians do accept risk and understand that there are no rewards for those unwilling to take risks. However, there remains a core group of people who do not accept risk and do not believe that any level of risk is reasonable in products made available to the public.

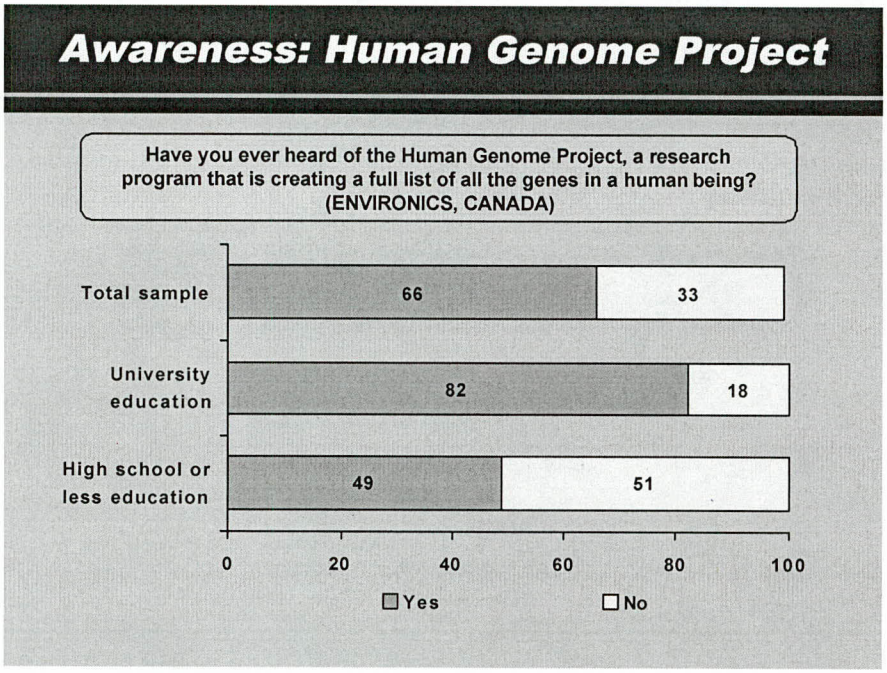


C. THE HUMAN GENOME AND USES OF HUMAN GENETIC MATERIAL

The Ipsos-Reid study dealt almost exclusively with questions that surround the Human Genome Project, and the potential impacts of human genetic research on Canadians. In addition, the MORI survey in the UK explored some of these issues, enabling us to make some comparisons across nations.

The first and most notable piece of data that the Ipsos-Reid survey reveals is the high level of awareness of the announcement of the mapping of the human genome. In all, two-thirds of Canadians said that they had heard of this project, in stark contrast with the low number of Canadians who have suggested they have even a moderate level of awareness of biotechnology. Indeed, the results of focus groups conducted as part of this wave of research reinforce this data, suggesting that this announcement may be a watershed point of awareness (and possibly) engagement on biotechnology.

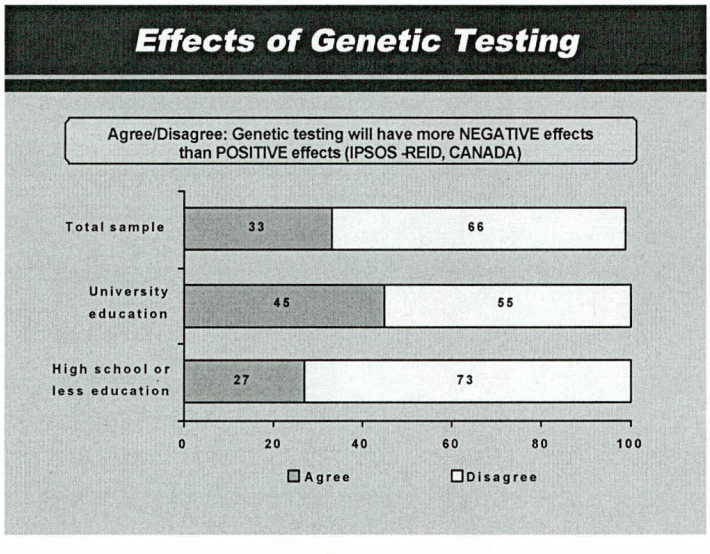
Awareness: Human Genome Project



For most Canadians, the mapping of the human genome is seen to hold virtually limitless potential, particularly in the realm of human health. In all, 88% of Canadians surveyed by Environics believe that the mapping of the human genome will lead to discoveries that will lead to increases in "our quality of life and health."

When it comes to genetic testing, however, many express reservations about who will be tested, and how such testing will be used. There are palpable fears about how this information will be used; in particular how it could be used to work *against* their interests. In Earnscliffe's focus groups and in Ipsos-Reid's data, the most obvious examples related to research that smacked of eugenics. More than six in ten agree with the statement "I fear what will happen if people start to conduct thorough genetic testing on fetuses." The results suggest that people expect there to be clear limits placed on the types of human genetic research that gets conducted in Canada.

In the end, while most support this type of research, there remains a substantial minority that has reservations. In the Ipsos-Reid survey, fully one-third of respondents said that "genetic testing would have more negative effects than positive effects," while two-thirds disagreed with that statement. Once again, this data points to an educational and socioeconomic gap on the risk/benefit question – those with lower levels of education are more likely to believe that there will be more negative than positive effects than those with higher levels of education, who tend to have a more positive outlook.



In the United Kingdom, attitudes are very similar to those found in Canada. There is widespread hope that developments in human genetics will bring cures to diseases (90% agreement), but a fair amount of trepidation about how far this research will go. More than half (56%) "worry that people could have access to their genetic information, and will know too much about them." Moreover, three in ten say that genetic research is tampering with nature and is therefore unethical under any circumstance.

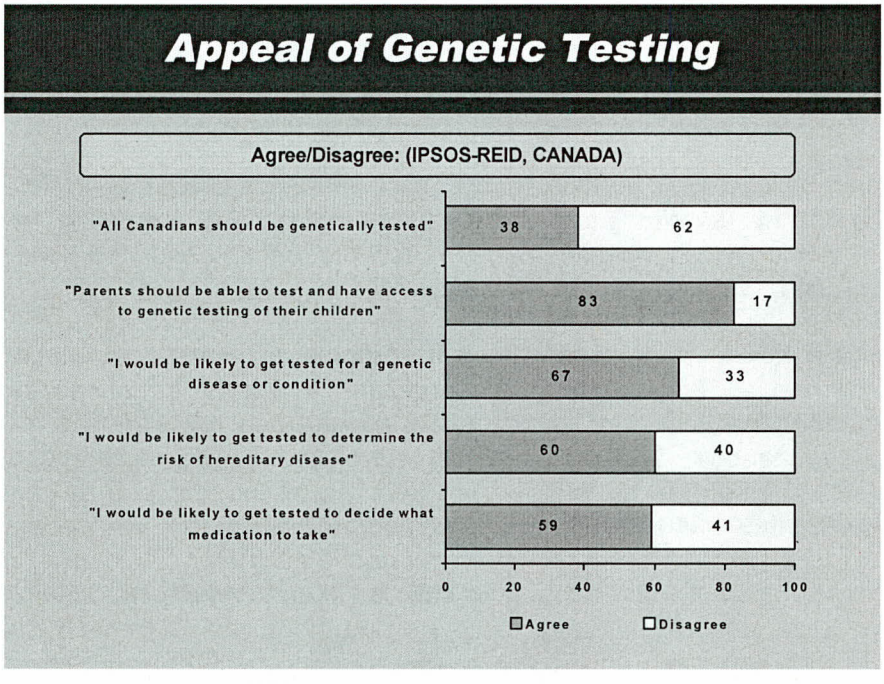
While many believe that genetic testing can be a positive step, in terms of whether and how genetic information will be used there are some notable nuances in opinion, most of which hinge on how the testing should be done, who should approve it, and who should have access to it.

Looking again at Canadian data, Ipsos-Reid findings point to a notable gap between the number that say that "all Canadians should be genetically tested" and the number that say they would get tested and use the information under specific circumstances. Genetic testing, in and of itself, does not garner broad interest (38%), whereas genetic testing for a specific disease or medical condition generates much higher levels of support (67%).

This result is consistent with the analysis outlined in earlier sections of this report about how Canadians evaluate applications, using the "marginal benefit" calculus (i.e. people evaluate them on a case-by-case basis, where the purpose of the application is the main driver determining the acceptability of an application, and the process is the main driver of opposition). The "purpose" benefit factor has two dimensions: the potential direct personal benefit involved and the substantiveness of that benefit (how important that benefit is perceived to be).

In this case, the purposes of genetic testing writ large are unclear and the benefits are indirect, whereas the purposes of the other applications are clearer, and more substantial. Furthermore, we would argue that the differences among the more specific applications can be explained by looking at the "substantiveness" dimension of this calculus – some are viewed as being more "marginally beneficial" than others. We would assert that Canadians weigh the risks relatively equally for all of the applications, since the process is roughly the same, meaning that this dimension has no net impact on the outcome when

comparing this group of applications. The data in the graph below suggests that a substantive beneficial purpose rationale for the testing generates broader acceptance of the idea of testing.

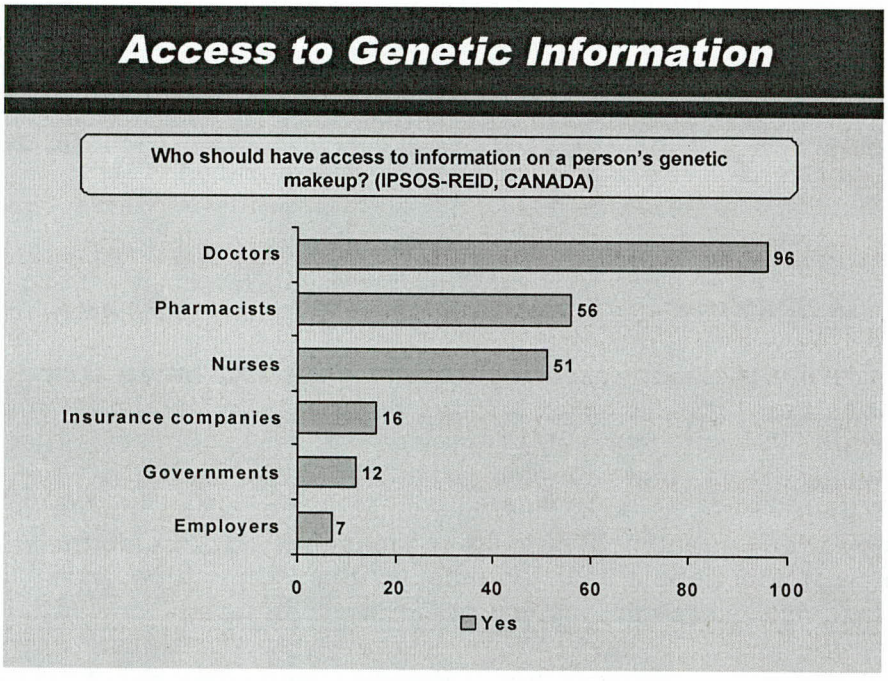


D. GENETIC PRIVACY

Of course, no discussion of the pros and cons of human genetic research and testing would be complete without a discussion of the issues of genetic privacy. Both the Ipsos-Reid survey in Canada and the MORI survey in the United Kingdom addressed these questions.

In Canada, the Ipsos-Reid survey approached this issue by asking respondents who among various individuals and groups should be allowed to have access to their genetic information. **The results indicate that most people are quite comfortable with their doctor or health professional having the information but very uncomfortable about insurance companies, governments and employers having access to this information.** The data points to a perception

that allowing doctors access to this information might provide a benefit to them, while this information may present risks when insurance companies, governments and employers have this information.



For the most part, results in the UK suggest that there is reluctance, but less than Canadians exhibit, to allow various interested parties to access this information.

- 76% do not believe insurance companies should be allowed to have access to this information, compared to 86% in Canada
- 71% oppose the idea of employers accessing this information to determine the likelihood of future ill health among employees
- There was some support (64%) for the idea of employers getting access to this information, where employees might be sensitive to particular products that they work with (like chemicals)

Another key dimension of the genetic privacy issue that was explored in the UK survey related to the question of permission – whether people and organizations should have the right to access this information with or without permission from the individual whose genetic characteristics are being studied. Among British

respondents, the result was overwhelmingly clear. People want their consent to be provided for *every* use of their genetic information.

- 86% said that people should always be asked for their permission for blood or tissue to be used in a genetic test.
- 90% said that giving consent was essential before a person's genetic information could be included in a genetic database for scientific research
- 80% said that researchers should have to give "fresh" consent for new research on existing samples of their genetic information

E. APPLICATIONS

Consistent with previous research, there is clear and broad support for applications that promise advances that contribute to human health and quality of life. There are some other applications, in the criminal justice and environmental fields, that are also seen to promise important benefits. However, there remains some reluctance to accept applications that do not promise clear and substantial benefits to humans. To that point, the area of biotechnology that people have the most trouble with is food. Again, these findings are broadly consistent with Earnscliffe's findings.

None of the other Canadian surveys explored these questions, but the MORI survey and the NC state surveys investigated the acceptability of numerous applications in the United Kingdom, United States and Japan. Below is a snapshot of some of the applications that were tested, and the results.

In the United Kingdom, the data suggests that there is broad support for various uses of biotechnology in the health field. We do not have data on the appeal of agricultural applications in the UK.

- 85% believe human genetic information should be used to develop cures for disease
- 96% believe that DNA testing should be used in the field of criminal justice, although far fewer were willing to use DNA samples in the case of non-violent crimes like drinking and driving or shop lifting

In Japan and the U.S., the public opinion research evidence points to similarly broad support for medical applications, but less clear support for agricultural applications. When a broad question is asked about these categories of applications, the evidence suggests that the differences are significant, but not overwhelming:

- In the U.S., 90% support medical applications; 72% support agricultural applications
- In Japan, 87% support medical applications; 75% support agricultural applications

However, when specific applications are described in more detail, support and opposition for applications within the two categories begin to diverge more substantially. For example, in Japan, the following applications were tested:

- Biotech insulin or other medicine: 73% support, 16% neutral, 11% oppose
- Higher-quality soy sauce or tofu: 29% support, 33% neutral, 34% oppose
- Biotech food ingredients, such as flavourings: 19% support, 34% neutral, 46% oppose

What this data indicates about biotech applications in Japan and the U.S. is consistent with what Earnscliffe has found in its qualitative and quantitative research in Canada – that the purpose of the application is a key driver of support, and when there is not a clear and substantial benefit, support will tend to be much lower. For the most part, agricultural applications do not present the kind of benefit that medical applications do, while the risks are perceived to be at least as great.

F. GM FOOD LABELING

GM food labeling was investigated in a number of the surveys utilized in this report. In all of the countries where research was done (with the exception of the U.S.), there was a clear and broad demand for GM food labeling. In the United States, unaided questions reveal broad support for labeling. However, when respondents are presented with some discussion of the FDA policy, opinions became more equivocal. A brief summary of the findings is as follows:

- A survey conducted by the Consumers Association of Britain showed that 90% were aware of GM food, and among those, 94% supported clear labeling on processed and non-processed foods.
- A survey of Europeans conducted by the European Commission revealed that 82% disagreed with the statement "it is not worth putting special labels on genetically modified food."
- A survey of Australians conducted by the Australian department of industry indicated that 89% of respondents agreed that "genetically modified foods should be labeled so people can decide whether they want to eat it or not."
- A survey of Canadians by the Toronto Star found that 98% of Canadians answered "yes" to the question "Should all genetically engineered foods be labeled?".

In the U.S., studies for Time magazine for the International Food Information Council revealed contrasting results among American consumers.

- A Time magazine survey reported that 82% agreed to the question: "Should genetically modified foods be labeled as such?"

Yet the International Food Information Council's data suggests that when the position of the FDA is introduced into the labeling question, results differ. The question they asked was as follows:

- "Some critics of the FDA say that any food produced through biotechnology should be labeled even if the food has the same safety and nutritional content as other foods. However, others, including the FDA, believe such a labeling requirement has no scientific basis, and would be costly and confusing to consumers. Are you more likely to agree with the labeling position of the FDA or with its critics? In all, 58% agreed with the FDA, while 38% agreed with critics on this labeling question.

Overall, Earnscliffe's interpretation of these findings is that while some segment of public opinion remains in flux and can be convinced to move in one direction or the other, in the current state of knowledge, the research points to a clear preference for labeling, not only in Canada, but in the U.S., the UK and Australia.

G. GOVERNMENT REGULATION AND CONTROL

The research found in this report as well as virtually all previous research has found that there are substantial concerns about the extent of control over biotechnology research and applications, and a demand for a credible regulatory framework by governments. The studies investigated in the Secondary Analysis section of this report confirm those findings and illustrate that they are evident not only in Canada but also in other countries.

According to Environics' data, Canadians express a general unease about government performance in this field: 2% say government has done an excellent job, 22% say they have done a good job, 42% say it has done a fair job, and 29% say it has done a poor job. These results mirror those found in Earnscliffe's survey. While not outrightly negative, these results suggest some concern that government may not have been doing all it can do to ensure that these applications are safe, and that there are some controls over biotech research.

In the United Kingdom, the questions were slightly different, but the results were similar: 71% said they had little or no confidence that rules and regulations were keeping pace with developments in biotechnology. Coupled with 70% who say they do not have enough information about biotechnological developments, it can be surmised that this concern about regulations keeping pace is, at least in part, a product of a lack of information.

Appendices

1. CBS Interview Schedule
2. CBS Moderator's Guide
3. Health and Environment Interview Schedule
4. Health and Environment Moderator's Guide

POLLARA AND EARNSCLIFFE

CBS Questionnaire Interview Schedule

PERCENT

1ab

1. a. (T) When you hear the word biology, do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive 42
Neutral 50
Negative 3

b. (T) When you hear the word technology, do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive 70
Neutral 24
Negative 4

2. (T) When you hear the word biotechnology, do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive 34
Neutral 48
Negative 13

3. (T) Over the last three months, have you heard anything about stories or issues involving biotechnology?

Yes 50
No 47

4. (T) Before today, had you ever talked about biotechnology with someone?

Yes 39
No 61

5a

Biotechnology applies science to living things such as plants and animals in order to develop new products and processes.

5ab

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 genetic modification or bio-engineering.

6

POLLARA AND EARNSCLIFFE

PERCENT

5. (T) Would you say you are very familiar, somewhat familiar, not very familiar, or not at all familiar with biotechnology?

Very familiar	8
Somewhat familiar	50
Not very familiar	29
Not at all familiar	12

6. (T) Is biotechnology a subject you are very interested in, fairly interested in, not too interested in, or not at all interested in?

Very interested in	14
Fairly interested in	47
Not too interested in	30
Not at all interested in	9

7. (NEW) 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	9
Somewhat support	52
Somewhat oppose	21
Strongly oppose	8

Please tell me if you strongly agree, agree, disagree or strongly disagree with the use of biotechnology in each of the following ways. (ROTATE)

8. (NEW) Salmon that are modified so they are market ready sooner, are more disease resistant, will cost less at the grocery store and be more widely available

Strongly agree	10
Agree	39
Disagree	31
Strongly disagree	16

9. (NEW) Trees modified to grow faster in cold climates like Canada

Strongly agree	16
Agree	49
Disagree	21
Strongly disagree	9

POLLARA AND EARNSCLIFFE

10 Trees modified to resist pests so they will be healthier

Strongly agree 22
Agree 55
Disagree 16
Strongly disagree 6

10. (NEW) (SPLIT SAMPLE) Genetic testing of embryos for inherited diseases such as cystic fibrosis
Taking human genes that fight disease and inserting them into plants, to help grow medicines for human consumption

Strongly agree 22
Agree 50
Disagree 18
Strongly disagree 7

Strongly agree 21
Agree 49
Disagree 18
Strongly disagree 9

11. * (NEW) (SPLIT SAMPLE) Corn that has been modified to enhance its nutritional value
Corn that has been modified to be produced in higher volumes, so it will cost less at the grocery store

Strongly agree 11
Agree 49
Disagree 24
Strongly disagree 12

Strongly agree 12
Agree 42
Disagree 28
Strongly disagree 15

POLLARA AND EARNSCLIFFE

12. (NEW) (SPLIT SAMPLE) Rice that has been modified to include vitamin A, to enhance its nutritional value/Drugs that contain genetically modified material to treat diseases like cancer

Strongly agree	15
Agree	53
Disagree	20
Strongly disagree	8

Strongly agree	32
Agree	53
Disagree	8
Strongly disagree	5

13. (NEW) (SPLIT SAMPLE) The use of genetically modified bacteria or plants to break down pollutants and toxic wastes/Using genetically modified micro-organisms to mass produce products like ethanol, which can be used as a source of fuel

Strongly agree	25
Agree	56
Disagree	9
Strongly disagree	5

Strongly agree	21
Agree	52
Disagree	15
Strongly disagree	7

14. (NEW) SPLIT SAMPLE 3 WAY Implanting plant genes into other plants to help improve the appearance of food products/Implanting plant genes into other plants to help improve the nutritional value of food products/Implanting plant genes into plants to develop health products and treatments.

Strongly agree	5
Agree	29
Disagree	42
Strongly disagree	22

Strongly agree 16
Agree 49
Disagree 19
Strongly disagree 11

Strongly agree 11
Agree 47
Disagree 23
Strongly disagree 13

15. (NEW) SPLIT SAMPLE 3 WAY Implanting animal genes into plants to help improve the appearance of food products/Implanting animal genes into plants to help improve the nutritional value of food products/Implanting animal genes into plants to develop health products and treatments

Strongly agree 5
Agree 16
Disagree 48
Strongly disagree 30

Strongly agree 8
Agree 32
Disagree 35
Strongly disagree 19

Strongly agree 13
Agree 45
Disagree 21
Strongly disagree 16

16. (NEW) SPLIT SAMPLE 3 WAY Implanting animal genes into humans to treat medical problems/Creating human organs in laboratories that would be used for transplantation/Altering the organs of animals like pigs so that they can be transplanted to replace diseased human organs

Strongly agree 11
Agree 44
Disagree 25
Strongly disagree 15

POLLARA AND EARNSCLIFFE

Strongly agree 21
Agree 47
Disagree 19
Strongly disagree 11

Strongly agree 18
Agree 42
Disagree 20
Strongly disagree 16

17. (T) 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 43
Poor 27

In each of the following areas, would you say that the federal government is doing an excellent, good, fair or poor job? How about (ROTATE)

18. (T) Ensuring that the interests of the average Canadian are taken into account as policies are developed for the use of biotechnology

Excellent 2
Good 15
Fair 39
Poor 33

19. (T) Ensuring that Canada benefits from the economic opportunities that biotechnology offers

Excellent 2
Good 20
Fair 45
Poor 16

POLLARA AND EARNSCLIFFE

20. (T) Ensuring that the health of Canadians is protected against risks associated with biotechnology

Excellent	3
Good	18
Fair	40
Poor	28

21. (T) Ensuring that the environment in Canada is protected against risks associated with biotechnology

Excellent	2
Good	17
Fair	40
Poor	30

22. (T) Ensuring that Canada benefits from the new products and processes that biotechnology offers

Excellent	2
Good	21
Fair	45
Poor	17

23. (T) Ensuring that Canadians are informed about the role of government in biotechnology

Excellent	2
Good	11
Fair	29
Poor	51

24. (NEW) Making sure that regulations on biotechnology are being enforced

Excellent	3
Good	19
Fair	37
Poor	23

25. (NEW) Ensuring that any long-term impacts of biotechnology on *the environment* are being studied and addressed

Excellent	2
Good	18
Fair	38
Poor	30

26. (NEW) Ensuring that any long-term impacts of biotechnology on *human health* are being studied and addressed

Excellent	2
Good	17
Fair	39
Poor	29

27. (NEW) Helping Canadian biotechnology companies become more innovative and competitive

Excellent	3
Good	21
Fair	40
Poor	14

28. (T) Ensuring that biotechnology is being used in ethical ways

Excellent	2
Good	20
Fair	41
Poor	23

How much priority do you feel the federal government should attach to each of the following roles...the highest priority, high priority, moderate priority or low priority? (ROTATE)

29. (T) Ensuring that the interests of the average Canadian are taken into account as policies are developed for the use of biotechnology

Highest priority	29
High priority	47
Moderate priority	17
Low priority	4

30. (T) Ensuring that Canada benefits from the economic opportunities which biotechnology offers

Highest priority	17
High priority	42
Moderate priority	32
Low priority	5

31. (T) Ensuring that the health of Canadians is protected against risks associated with biotechnology

Highest priority	46
High priority	40
Moderate priority	10
Low priority	3

32. (T) Ensuring that the environment in Canada is protected against risks associated with biotechnology

Highest priority	40
High priority	44
Moderate priority	12
Low priority	3

33. (T) Ensuring that Canada benefits from the new products and processes which biotechnology offers

Highest priority	18
High priority	43
Moderate priority	31
Low priority	5

34. (T) Ensuring that Canadians are informed about the role of government in biotechnology

Highest priority	29
High priority	43
Moderate priority	22
Low priority	5

35. (NEW) Making sure that regulations on biotechnology are being enforced

Highest priority	39
High priority	45
Moderate priority	12
Low priority	2

36. (NEW) Ensuring that any long-term impacts of biotechnology on *the environment* are being studied and addressed

Highest priority	41
High priority	44
Moderate priority	12
Low priority	3

37. (NEW) Ensuring that any long-term impacts of biotechnology on *human health* are being studied and addressed

Highest priority	47
High priority	41
Moderate priority	9
Low priority	3

38. (NEW) Helping Canadian biotechnology companies become more innovative and competitive

Highest priority	15
High priority	35
Moderate priority	39
Low priority	9

39. (T) Ensuring that biotechnology is being used in ethical ways

Highest priority	42
High priority	41
Moderate priority	13
Low priority	2

POLLARA AND EARNSCLIFFE

40. (T) Which of the following views is closest to your own? (ROTATE)

Decisions about biotechnology should be based mainly on the views and advice of experts about the risks and benefits. 62

Decisions about biotechnology should be based primarily on the average Canadian's views of risks and benefits..... 34

41. (T) And which of these two views is closest to your own? (ROTATE)

Decisions about biotechnology should be based mainly on the moral and ethical issues involved 39

Decisions about biotechnology should be based mainly on the scientific evidence of risk and benefit. 55

42. (NEW) Which of these two views is closest to your own?

Some people say that biotechnology is just like other technologies – used properly, it will provide substantial benefits..... 42

Other people say that biotechnology is not like other technologies because it involves a high level of risk, and because of those risks, biotechnology should be slowed down..... 52

B. (NEW) Which of these two views is closest to your own?

Some people say that biotechnology is just like other technologies – used properly, it will provide substantial benefits 65

Other people say that biotechnology is not like other technologies because it involves a high level of risk, and because of those risks, biotechnology should be stopped 29

Scientific developments in the area of genetic research now provide the opportunity to find out some of an individual's genetic information. I'm going to read you a list of arguments for and against allowing certain uses of genetic information in Canada, and I want you to tell me which of the arguments represents the view that is closest to your own. (ROTATE)

43. a. (NEW) Providing insurance companies with the right to ask about an individual's genetic information when he or she applies for insurance coverage, in order to determine that person's risk of future health problems 11

OR Not allowing insurance companies to have access to the genetic information of their clients, so they could not deny coverage as a result of knowing this information. 86

b. (NEW) Allowing Canadians the right to provide their genetic information to insurance companies if they want, to get lower rates for themselves by proving they are not predisposed to certain genetic disorders 45

POLLARA AND EARNSCLIFFE

OR Not allowing Canadians the right to provide this information to their insurance companies even if they want to, because allowing this to occur would probably mean that Canadians with unfavourable genetic information could not get coverage 52

44. * (NEW) Providing employers with the right to ask about an individual's genetic information when they apply for work, to find out if they might be unhealthy in the future 17

OR Not allowing employers the right to ask about an individual's genetic information when they apply for work, because they might base their decisions on whether the person is predisposed to a disease or disorder 82

45. a. (NEW) (SPLIT SAMPLE) Allowing scientific researchers or companies access to genetic information in order to study genetic traits and develop cures for illness if an individual's name is de-linked from the genetic information 58

OR Not allowing scientific researchers access to genetic information because they might use that information for purposes that people don't agree with 36

b. (NEW) Allowing scientific researchers or companies access to genetic information in order to study genetic traits and develop cures for illness if people consent to their genetic information being used .. 76

OR Not allowing scientific researchers access to genetic information because they might use that information for purposes that people don't agree with 22

END OF ROTATION

46. (NEW) The Biosafety Protocol is an international agreement developed by 140 countries, including Canada, to set out procedures for achieving safe trade, commercial handling and use of genetically modified organisms. If Canada were to join this agreement, would it increase, decrease, or make no difference in the level of confidence you have about the federal government's management of the environmental risks of biotechnology products?

Increase confidence 34
Make no difference 49
Decrease confidence 10

47. Most new inventions are protected by what are called patents. Patents ensure that inventors are rewarded by making sure that their inventions cannot be copied for a period of time. However, it also means that until the patent expires, the inventor controls the availability and price of the invention.

A (T) Some people feel that the idea of patent protection is necessary in the field of biotechnology, because we need to encourage inventions in this area for all the benefits which they can bring 51

Others are uncomfortable with the idea of patents in the field of biotechnology, because the benefits of new inventions may only be available to those who can afford to pay more 44

POLLARA AND EARNSCLIFFE

B. (T) Some people feel that the idea of patent protection is necessary in the field of biotechnology, because we need to encourage inventions in this area for all the benefits which they can bring 47

Others are uncomfortable with the idea of patents in the field of biotechnology, because they think there is something wrong with the idea of patenting a life form such as an animal or a plant 47

Which of these two points of view is closest to your own?

Biotechnology researchers and the governments of the United States and Great Britain recently announced that the Human Genome Project had successfully mapped the genetic code of human beings.

48. (NEW) From what you know, would you say that identifying or "mapping" human DNA ultimately presents more drawbacks than benefits to humans, or more benefits than drawbacks?

More drawbacks than benefits 17

More benefits than drawbacks 77

49. (NEW) Some people say the ability to map DNA gives scientists too much power to influence something that God or nature created 26

Other people say that the human DNA map will provide us with the ability to develop cures and treatments that will save and extend lives 71

Which of these two views is closest to your own?

50. (REVISED) A. (NEW) The mapping of the human genome has led a number of organizations to apply for patents on genes with particular traits within the newly discovered human DNA map (to develop products such as genetic therapies or drugs). Would you say that the potential risks of patenting genes are greater than the benefits, or are the potential benefits greater than the risks?

More potential risks than benefits 37

More potential benefits than risks 52

B. (NEW) The Canadian courts recently decided that it is legal to patent a mouse that had been genetically modified to have certain traits, for medical research purposes. In other words, the creators of the mouse can be paid royalties when companies and other researchers use the mouse in testing. Would you say you are very comfortable, somewhat comfortable, somewhat uncomfortable, or very uncomfortable with this court decision?

Very comfortable 11

Somewhat comfortable 33

Somewhat uncomfortable 33

Not at all comfortable 20

POLLARA AND EARNSCLIFFE

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

51. Because it is important to take advantage of the benefits, government should encourage the development of biotechnology, although there may be some unknown risks/Government should encourage the development of biotechnology, although there may be some unknown risks

Strongly agree	23
Agree	50
Disagree	15
Strongly disagree	9

Strongly agree	19
Agree	53
Disagree	16
Strongly disagree	10

52. (T) SPLIT SAMPLE Government should inform people about biotechnology, and let them decide for themselves whether they want to use biotechnology products/Government should use its expertise to make decisions about which products should be available, on behalf of consumers

Strongly agree	66
Agree	28
Disagree	3
Strongly disagree	3

Strongly agree	27
Agree	42
Disagree	16
Strongly disagree	14

53. (NEW) SPLIT SAMPLE Genetic information is different from other health information, and the rules governing access to this information should be more strictly regulated/Genetic information is no different than other health information, and should be regulated in the same way

Strongly agree	61
Agree	29
Disagree	5
Strongly disagree	3

POLLARA AND EARNSCLIFFE

Strongly agree 29
Agree 36
Disagree 15
Strongly disagree 18

54. (NEW) SPLIT SAMPLE If regulators in the United States approve of a product made from biotechnology, Canadian regulators should "fast-track" approval of that product here in Canada, to make sure Canadians will have access to the product more quickly/Other countries' approval process for biotechnology products should have no bearing on the process or speed at which Canadian regulators determine whether the product should be allowed

Strongly agree 25
Agree 30
Disagree 22
Strongly disagree 21

Strongly agree 36
Agree 36
Disagree 18
Strongly disagree 8

55. (NEW) SPLIT SAMPLE 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/The federal government should help Canadian biotechnology companies become world leaders

Strongly agree 41
Agree 47
Disagree 7
Strongly disagree 3

Strongly agree 26
Agree 39
Disagree 20
Strongly disagree 12

END OF ROTATION

POLLARA AND EARNSCLIFFE

56. (NEW) If the best available scientific evidence indicates that genetically modified grain grown by Canadian farmers is safe, should other countries have the right to ban sales of that grain or should Canada have the right to insist (through international bodies) that its grain be sold?

Other countries should have the right to ban 56
Canada should have the right to insist that its grain be sold 38

57. (NEW) Some people say that countries trying to ban genetically modified grain from countries like Canada are doing so because they think there is a real risk to health. Other people say they are doing that in order to get rid of competition to their own grain. Which of these views is closest to your own?

Real risk to human health 51
Get rid of competition to their own grain 36

58. (NEW) If you were told that you could go to your doctor tomorrow and find out more information about your own genetic make-up, would you be very likely, somewhat likely, not very likely, or not at all likely to do so?

Very likely 27
Somewhat likely 29
Not very likely 25
Not at all likely 17

59. (NEW) If more information regarding biotechnology were made available, which of the following is something you would more likely do: Immediately take the time to seek out that information and learn more OR get the information at a time when you thought it was important to know more?

Immediately take the time to seek out information 34
Get the information at a time when you thought it was important to know more 65

60. When it comes to information about biotechnology, would you want information sent to you, or made available to you when you want it?

Sent to you 27
Made available when you want it 72

I would like to read you some statements in support of biotechnology. In each case, please tell me if in your view, the statement is a very strong argument, a somewhat strong argument, or not a very strong argument. The first one is: (ROTATE POSITIVE AND NEGATIVE BATTERIES, AS WELL AS INDIVIDUAL QUESTIONS WITHIN EACH BATTERY)

61. (NEW) Biotechnology involves the kind of scientific research and new industries that will produce well-paying jobs and give Canada an edge in international trade

Very strong argument	31
Somewhat strong argument	44
Not a very strong argument	22

62. (NEW) Biotechnology scientists are finding out more and more about the human genetic code and using what they have learned to diagnose and treat serious illnesses

Very strong argument	54
Somewhat strong argument	37
Not a very strong argument	7

63. (NEW) Biotechnology is producing genetically modified organisms that can clean up environmental damage like pollution and oil spills

Very strong argument	46
Somewhat strong argument	37
Not a very strong argument	13

64. (NEW) Biotechnology will soon be able to produce foods that can make people healthier

Very strong argument	29
Somewhat strong argument	40
Not a very strong argument	28

65. (NEW) The federal government has comprehensive regulatory standards in place to ensure that products produced through biotechnology are safe

Very strong argument	24
Somewhat strong argument	44
Not a very strong argument	27

POLLARA AND EARNSCLIFFE

67 66. Which of the statements above is the *strongest* argument in favour of the development of biotechnology

Scientific research, jobs 10
Human genetic code, health 52
GM organisms, environment 14
Improved foods 9
Government regulations, safe 9

I would like to read you some statements in opposition to biotechnology. In each case, please tell me if in your view, the statement is a very strong argument, a somewhat strong argument, or not a very strong argument.

68 67. (NEW) Genetically modified crops may contaminate neighbouring organic and non-GM fields

Very strong argument 31
Somewhat strong argument 37
Not a very strong argument 25

69 68. (NEW) Genetic modification may transfer allergens from one type of food to another

Very strong argument 29
Somewhat strong argument 41
Not a very strong argument 22

70 69. (NEW) Herbicide resistant crops may transfer herbicide resistance to its weed relatives

Very strong argument 29
Somewhat strong argument 42
Not a very strong argument 21

71 70. (NEW) Pests may develop resistance to new pest resistant genes in certain genetically modified trees, which could make them stronger and more able to attack trees and other plants

Very strong argument 39
Somewhat strong argument 39
Not a very strong argument 17

5

POLLARA AND EARNSCLIFFE

71. Which of the statements above is the *strongest* argument against the development of biotechnology?

Contaminate neighbouring fields 20
Transfer allergens 20
Transfer herbicide resistance 13
Pest resistance 36

For each of the following statements, please indicate whether knowing this fact makes you much more confident, somewhat more confident, or no more confident about the safety of products made through biotechnology? (ROTATE)

72. (NEW) (SPLIT SAMPLE) Before any genetically modified food is allowed in Canada, it must be scientifically proven to scientists at Health Canada that it is as safe and nutritious as foods of the same type that are already available/The Canadian Food Inspection Agency conducts an environmental safety assessment on new plants grown using biotechnology before they are allowed to be grown, to assure no negative impacts on the environment

Much more confident 32
Somewhat more confident 47
No more confident 20

Much more confident 33
Somewhat more confident 47
No more confident 19

73. (T) To the best of your knowledge, in the last month have you eaten any food products that contain genetically modified ingredients?

Yes 29
No 48

POLLARA AND EARNSCLIFFE

CBS Focus Groups
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)

- 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. Please write them down on a piece of paper.
- How do you feel when you hear the term biotechnology? What kinds of reactions do you have? Please tell us what you wrote down, and where you developed these impressions.
- What about genetic modification? How does that make you feel? What are your impressions? (If different than biotechnology) Why?
- Biotechnology has applications in a number of fields. Please write down examples of products or applications that you have heard about. (PROBE: Health/Environment/Food)

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.

- How often have you heard about biotechnology? Would you say you have heard more, less, or no more or less than in previous months? What have you heard about aspects of biotechnology, and from what source? Do you hear more about this from government, from the industry, interest groups, the media?
- Thinking about what you have been hearing lately, is it more positive or more negative about the impact and potential impact of biotechnology?
- Have your views changed over the past year or two on this subject, and why?

- Is this a subject you follow closely in the news, or not?
- Biotechnology researchers and the governments of the United States and Great Britain recently announced that the Human Genome Project had successfully mapped the genetic code of human beings. Before tonight, had you heard about this?
- What do you think about identifying or "mapping" human DNA? What are the advantages and disadvantages?

Applications (20 min)

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: Why do you say that? (ROTATED FOR EACH GROUP)

- Taking human genes that fight disease and inserting them into plants, to help mass produce medicines for human consumption
- Implanting plant genes into 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
- Using genes from one organism to change another organism in order to help clean up environmental problems (bio-remediation).
- Rice that has been modified to include vitamin A, to enhance its nutritional value
- Changing the genetic make-up of trees to make them resistant to diseases/resistant to insect attack/able to grow in cold climates
- Modifying genes in a human embryo to eliminate an inherited disease
- Salmon that are modified so they are market ready sooner, are more disease resistant, will cost less at the grocery store and be more widely available
- Implanting animal genes into plants like a tomato to help improve the nutritional value or appearance of food products

Let's try to clear up what elements are more likely to create acceptance or rejection. PROBE: health impact/environmental impact/cost impact/ethical impact/crossing organisms outside species or family vs inside species or family)

POLLARA AND EARNSCLIFFE

Roles and Responsibilities of The Federal Government (15 min)

From what you know, what are the responsibilities of the federal government in the area of biotechnology?

(open-ended, then PROBE economic/health/environmental/safety/enforcement/scientific research/long-term research)

How effective would you say the government is at carrying out these roles? Have you read or heard anything about what the federal government is doing in any of these areas? (If you haven't heard anything), why do you think the government is effective/not effective?

What would you say are the priorities the federal government should pursue in this area going forward? (hand-out, ask participants to rank priorities). Discuss top 2 and bottom 2 priorities for each person, why those were chosen.

What would you say is the ideal set of roles for government in this area? Can it do all of these? Should they do some? Which ones?

Risk Measurement and Decision Making (15 min)

The field of biotechnology raises issues of risk and benefit to society. I'm going to ask a few questions that attempt to get at how you feel about what the risks and benefits are, and how you think decision makers should approach decisions regarding biotechnology.

- What factors should be taken into consideration when making decisions about biotechnology? (if not raised, what role should moral and ethical issues play?)
- How much do you think scientists (government/biotech companies/university researchers) know about the risks associated with biotechnology applications?
- Some people say until more is known about the risks, governments should slow the use of biotechnology. Others say we have to accept some risk to achieve benefits from biotechnology research. What do you think is the best approach? Please explain your point of view?
- If most scientific evidence says that a particular use of biotechnology is safe, should that be the approach we use? OR should we use a precautionary principle, where we ban a product if there is any potential of future risk? Why?
- Who should be the primary decision makers about biotechnology? Should government scientists/other scientists/policy makers/ordinary Canadians/ be the primary decision makers about biotechnology? If ordinary Canadians get involved, how should they be involved?

POLLARA AND EARNSCLIFFE

Genetic Privacy (15 min)

Scientific developments in the area of genetic research now provide the opportunity to find out some of an individual's genetic information. This obviously has implications for a number of aspects of Canadians' lives. I'm going to ask some questions about certain uses of genetic information in Canada, and I want you to tell me what you think about it.

- How would you feel if insurance companies had the right to ask about an individual's genetic information when he or she applies for insurance coverage, in order to determine that person's risk of future health problems? (IF CONTRARY ARGUMENT NOT RAISED, THEN RAISE IT FOR DISCUSSION) Not allowing insurance companies to have access to the genetic information of their clients, so they could not deny coverage as a result of knowing this information.

- What if the question were about allowing Canadians the right to provide their genetic information to insurance companies if they want, to get lower rates for themselves by proving they are not predisposed to certain genetic disorders? What do you think about this idea? Why? (IF CONTRARY ARGUMENT NOT RAISED, THEN RAISE IT FOR DISCUSSION) The contrary argument would be to disallow Canadians the right to provide this information to their insurance companies if they want to, because allowing this to occur would probably mean that Canadians with unfavourable genetic information could not get coverage.

- Issues involving "genetic privacy" also touch on scientific research. What do you think about allowing scientists or companies to have access to Canadians' genetic information in order to study genetic traits and develop cures for illness? (IF THESE ARGUMENTS NOT RAISED, THEN RAISE FOR DISCUSSION) arguments that might engender support (as long as the individual's name is de-linked from the genetic information/as long as they consent) as well as opposition (because scientists might use that information for purposes that people don't agree with/the scientists might make a profit)

Patenting (15 min)

Most new inventions are protected by what are called patents. Patents ensure that inventors are rewarded by making sure that their inventions cannot be copied for a period of time. However, it also means that until the patent expires, the inventor controls the availability and price of the invention.

- Some people feel that the idea of patent protection is necessary in the field of biotechnology because we need to encourage inventions in this area – without this protection, people wouldn't invent at the speed that they might have in the past. Others

are uncomfortable with the idea of patents in the field of biotechnology, because there is something wrong with the idea of patenting a life form such as an animal or plant. Which of these two points of view is closer to your own? Let's discuss your views.

- You recall that we discussed the Human Genome Project earlier in tonight's discussion, the effort in the U.S. and UK to discover the human genetic map. This initiative has implications for patenting. The mapping of the human genome has led a number of organizations to apply for patents on genes with particular traits. Would you say that the potential risks of patenting genes are greater than the benefits, or are the potential benefits greater than the risks?

- The Canadian courts recently decided that it is legal to patent a mouse that had been genetically modified to have certain traits, for medical research purposes. In other words, the creators of the mouse can be paid royalties when companies and other researchers use the mouse in testing. Would you say this court decision is something you agree with or disagree with? Why?

  - The federal government has launched an appeal of this decision to the Supreme Court of Canada. They have done so for two main reasons. First, the Patent Act does not include provisions that allow for the patenting of higher life forms. Second, the Government of Canada believes that before laws are passed to address this issue, the views of Canadians must be heard. The government has launched a public consultation process through the Canadian Biotechnology Advisory Committee to receive input from Canadians. Would you say that this set of actions is something you agree or disagree with?

Communications Testing (20 min)

When it comes to learning about the potential benefits of biotechnology, who are you more likely to trust to have the most reliable information? Probe: biotech industry, federal government, provincial government, non-governmental organizations, university researchers. In addition, do you trust them to give it to you in an honest and clear fashion?

How about when it comes to the potential drawbacks associated with biotechnology? (same 34)

(ROTATE POSITIVE AND NEGATIVE ARGUMENTS)

I'm going to read a series of arguments that people make when they advocate biotechnology. Thinking about each of the following arguments, which resonate with you?

- Biotechnology involves the kind of scientific research and new industries that will produce well-paying jobs and give Canada an edge in international trade

- Biotechnology scientists are finding out more and more about the human genetic code and using what they have learned to diagnose and treat serious illnesses

- Biotechnology is producing genetically modified organisms that can clean up environmental damage like pollution and oil spills

- Biotechnology will soon be able to produce foods that can make people healthier

- The federal government has comprehensive regulatory standards in place to ensure that products produced through biotechnology are safe (please probe different departments in the discussion – HC, CFIA, EC)

I'm going to read a series of arguments that people make when they outline the drawbacks of biotechnology. Thinking about each of the following arguments, which resonate with you?

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

- Genetic modification may transfer allergens from one type of food to another

- Herbicide resistant crops may transfer herbicide resistance to its weed relatives

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

- Looking at all of the positive and all of the negative arguments, which are most convincing to you about biotechnology?

POLLARA AND EARNSCLIFFE

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Health and Environment Questionnaire Interview Schedule

I'd like to conduct a survey to gather your opinions. Your participation is completely voluntary and no one will try to sell you anything. (sponsor identification at end of questionnaire)

PERCENT

1ab

1. (T) SPLIT SAMPLE When you hear the word a biology/b technology, do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive	43
Neutral	48
Negative	3

Positive	62
Neutral	29
Negative	6

2. (T) When you hear the word biotechnology, do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive	34
Neutral	46
Negative	14

3. (NEW) What about genetic modification? When you hear those words, do you have a positive reaction, a neutral reaction, or a negative reaction?

Positive	16
Neutral	33
Negative	45

4ab

4. (NEW) SPLIT SAMPLE Over the last three months, have you heard anything about stories or issues involving biotechnology/ Over the last three months, have you heard anything about stories or issues involving genetic modification?

Yes	57
No	41

Yes	70
No	28

POLLARA AND EARNSCLIFFE

5. (T) Before today, had you ever talked about biotechnology or genetic modification with someone?

Yes	53
No	47

Biotechnology applies science to living things such as plants and animals in order to develop new products and processes.

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 genetic modification or bio-engineering.

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

Very familiar	7
Somewhat familiar	49
Not very familiar	30
Not at all familiar	14

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

Very interested in	13
Fairly interested in	50
Not too interested in	27
Not at all interested in	10

8. (NEW) 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	43
Somewhat oppose	25
Strongly oppose	12

In your opinion, does biotechnology bring major benefits, modest benefits, modest drawbacks, or major drawbacks in each of the following areas? How about: (ROTATE)

9. (T) SPLIT SAMPLE The health of Canadians today/The health of Canadians over the longer term

Major benefits	22
Modest benefits	38
Modest drawbacks	16
Major drawbacks	12

Major benefits	26
Modest benefits	34
Modest drawbacks	12
Major drawbacks	12

10. (T) SPLIT SAMPLE Canada's environment today/Canada's environment over the longer term

Major benefits	17
Modest benefits	39
Modest drawbacks	17
Major drawbacks	11

Major benefits	22
Modest benefits	34
Modest drawbacks	12
Major drawbacks	15

11. (T) SPLIT SAMPLE The quality of food that Canadians consume today/The quality of food that Canadians consume over the longer term

Major benefits	19
Modest benefits	35
Modest drawbacks	22
Major drawbacks	12

Major benefits	20
Modest benefits	37
Modest drawbacks	14
Major drawbacks	16

12. (T) 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	3
Somewhat familiar	20
Not very familiar	43
Not at all familiar	33

POLLARA AND EARNSCLIFFE

13. (NEW) Overall, do you think the federal government is doing an excellent, good, fair or poor job of regulating biotechnology?

Excellent	1
Good	11
Fair	36
Poor	26
DK	26

14. (NEW) How familiar would you say you are with the ways in which research into the safety of food-related biotechnology products (which are often referred to as genetically modified or GM foods) is conducted in Canada? (very, somewhat, not too, not at all)

Very familiar	3
Somewhat familiar	30
Not very familiar	38
Not at all familiar	27

15. (NEW) And what about health-related biotechnology products? Would you say you are very, somewhat, not very, or not at all familiar?

Very familiar	4
Somewhat familiar	33
Not very familiar	34
Not at all familiar	28

16. (NEW) And what about environmental-related biotechnology products? Would you say you are very, somewhat, not very, or not at all familiar?

Very familiar	4
Somewhat familiar	31
Not very familiar	37
Not at all familiar	26

ROTATE 17-19

17. (NEW) Once a food product developed using biotechnology has been evaluated and approved by the federal government, how confident are you about the safety of the product? (very confident, somewhat confident, not very confident, not at all confident)

Very confident	13
Somewhat confident	46
Not very confident	27
Not at all confident	13

18. (NEW) And what about a health-related biotechnology product? (very confident, somewhat confident, not very confident, not at all confident)

Very confident	13
Somewhat confident	49
Not very confident	23
Not at all confident	12

19. (NEW) And what about an environmental biotechnology product? (very confident, somewhat confident, not very confident, not at all confident)

Very confident	10
Somewhat confident	48
Not very confident	24
Not at all confident	13

If you were to hear scientific information regarding biotechnology from the following, would you be likely to feel that what they are saying is very credible, somewhat credible, not very credible or not at all credible? How about (ROTATE)

20ab

20. (NEW) (SPLIT SAMPLE) University scientists or researchers who are funded by grants/University scientists or researchers who are funded by biotechnology companies

20a 20b

Very credible	24
Somewhat credible	56
Not very credible	13
Not at all credible	5

Very credible	15
Somewhat credible	49
Not very credible	23
Not at all credible	11

21. (NEW) Scientists or researchers that work for biotechnology companies

Very credible	14
Somewhat credible	49
Not very credible	22
Not at all credible	12

POLLARA AND EARNSCLIFFE

22a

22. (NEW) (SPLIT SAMPLE) Scientists or researchers that work for environmental organizations, like Greenpeace or the Sierra Club/Scientists or researchers that work for environmental organizations, like Ducks Unlimited or the Nature Conservancy of Canada

22a/b — 22b

Very credible	25
Somewhat credible	51
Not very credible	13
Not at all credible	7

Very credible	33
Somewhat credible	52
Not very credible	10
Not at all credible	3

23. (NEW) Government scientists or researchers

Very credible	21
Somewhat credible	56
Not very credible	15
Not at all credible	6

24. (NEW) International organizations like the World Health Organization

Very credible	33
Somewhat credible	52
Not very credible	8
Not at all credible	4

25a — 25b

25a-c

25. (NEW) Government and university researchers working together/Government and private sector researchers working together/Private sector and university researchers working together — 25c

Very credible	30
Somewhat credible	55
Not very credible	10
Not at all credible	3

Very credible	18
Somewhat credible	61
Not very credible	13
Not at all credible	6

Very credible 25
Somewhat credible 56
Not very credible 12
Not at all credible 5

26. (NEW) (3-way SPLIT SAMPLE) How confident would you say you are in the ability of ***Health Canada/Environment Canada/The Canadian Food Inspection Agency*** to ensure that biotechnology products within its realm of responsibility are safe? (ROTATE) (very, somewhat, not very, not at all)

Very confident 18
Somewhat confident 53
Not very confident 20
Not at all confident 6

Very confident 15
Somewhat confident 54
Not very confident 21
Not at all confident 8

Very confident 15
Somewhat confident 56
Not very confident 22
Not at all confident 6

27. (NEW) Which of these two views is closest to your own? ***GM*** foods should meet the same testing standards that all other foods in Canada must meet OR ***GM*** foods should meet higher standards than other foods in Canada must meet (ROTATE)

Same standards 31
Higher standards 66

28. (NEW) And which of these two views is closest to your own? Health treatments that use genetically modified material (such as drugs) should meet the same testing standards that all other drugs in Canada must meet OR Health treatments that use genetically modified material (such as drugs) should meet higher standards than other drugs must meet (ROTATE)

Same standards 34
Higher standards 64

There are a number of areas where the federal government invests in research and development. Please indicate whether you think the federal government should place a very high priority, a high priority, a medium priority, or lower priority on the following areas of research: (ROTATE)

29. (NEW) Basic science, which increases knowledge and can lead to new discoveries

Very high 34
High 44
Medium 18
Low 3

30. (NEW) Research that provides scientific evidence to help support decision making and the regulatory process

Very high 27
High 42
Medium 24
Low 3

31. (NEW) Research with more immediate economic benefits that could lead to job creation.

Very high 32
High 39
Medium 22
Low 5

32. (NEW) 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 29
About the same 30
Weaker 19
Don't know 22

33. (T) 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? ***(ROTATE)***

Regulate for safety 16
Support development of the industry 22
Equal emphasis 46
Don't know 16

POLLARA AND EARNSCLIFFE

34. (T) Which role do you think the federal government *should* put more emphasis on now/in the future, or should it put equal emphasis on both?

Regulate for safety 27
Support development of the industry 10
Equal emphasis 60
Don't know 3

35. (NEW) Some people say that it is impossible for the federal government to regulate industry and to support industry at the same time. Other people say that government can and should be involved in both of these activities, as long as the two functions are separated (between departments). Which of these two views is closest to your own? (ROTATE)

Impossible to do both 23
Can and should be involved in both of the activities, separate functions 72

36. (NEW) In your view, does the federal government do an excellent, good, fair, or poor job at keeping its regulatory and support actvities to **Canadian industry** separate? In your view, does the federal government do an excellent, good, fair, or poor job at keeping its regulatory and support activities to the **Canadian biotechnology industry** separate?

Excellent 2
Good 25
Fair 42
Poor 16
Don't know 16

Excellent 2
Good 25
Fair 40
Poor 12
Don't know 21

37. (NEW) Which of the following views is closest to your own? (ROTATE)

Decisions by the regulatory system governing biotechnology should be based mainly on the views and advice of experts and scientists 61

Decisions by the regulatory system governing biotechnology should be based primarily on the views of average Canadians 31

POLLARA AND EARNSCLIFFE

38. (T) To the best of your knowledge, in the last month have you eaten any food products which contain genetically modified ingredients?

Yes 35
No 42
Don't know 22

39. (NEW) 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 13
Somewhat comfortable 34
Not very comfortable 28
Not at all comfortable 23

40. (NEW) About two-thirds of processed foods contain ingredients that have been genetically modified 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? (ROTATE)

Makes more uncomfortable, may pose risks 45
Makes more comfortable, no safety problems thus far 49

41. (T) 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 27
Buy but plan to find out more 30
Not buy until you found out more 29
Never buy again 11

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

a. (NEW) Some people say there's nothing special about selling GM food because the food has been tested and is safe 48

Other people say it should not be sold because it might carry future risks to health 46

POLLARA AND EARNSCLIFFE

Which of the following views is closest to your own view? (ROTATE)

b. Some people say there's nothing special about selling GM food because it's just another way of growing and preparing food 46

Other people say it should not be sold because it might carry future risks to health..... 45

43. (NEW) Some people say a public debate about the safety of GM foods like the one between some environmental groups and some food companies helps get information to the public. Other people say the safety of GM foods is primarily an issue for scientists to resolve and public argument is not useful. Which is closest to your own view?

Helps get information to the public 73

Issue for scientists, public argument not useful 22

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

44. (NEW) 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/Government should commit more resources to the regulatory system and the scientific research that supports it, to ensure the environmental safety of biotechnology products/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 71

Agree 23

Disagree 3

Strongly disagree 2

Strongly agree 59

Agree 35

Disagree 2

Strongly disagree 2

Strongly agree 39

Agree 39

Disagree 13

Strongly disagree 5

POLLARA AND EARNSCLIFFE

45a

45. SPLIT SAMPLE Government should encourage the development of biotechnology although there may be some unknown risks to human health/Government should encourage the development of biotechnology although there may be some unknown risks to the environment

45b

45ab

a

Strongly agree 18
Agree 34
Disagree 20
Strongly disagree 26

b

Strongly agree 15
Agree 40
Disagree 25
Strongly disagree 17

46a

46. (T) (SPLIT SAMPLE) The government should increase its regulation of biotechnology/Biotechnology is adequately regulated by government

46ab

46b

Strongly agree 54
Agree 35
Disagree 5
Strongly disagree 3

Strongly agree 13
Agree 37
Disagree 20
Strongly disagree 14

47a

47. (NEW) (SPLIT SAMPLE) The government should conduct further research into the long-term health impacts of biotechnology before allowing any further use of biotechnology/The government should conduct further research into the long-term environmental impacts of biotechnology before allowing any further use of biotechnology

47ab

47b

Strongly agree 58
Agree 28
Disagree 10
Strongly disagree 3

Strongly agree 52
Agree 32
Disagree 12
Strongly disagree 3

(6)

48. (T) SPLIT SAMPLE When I see a product on a store shelf, I assume that it must be safe/When I see a product on a store shelf, I assume that it must have been tested for safety by the government

Strongly agree	33
Agree	37
Disagree	16
Strongly disagree	12

Strongly agree	44
Agree	34
Disagree	11
Strongly disagree	9

49. (T) SPLIT SAMPLE Enough is known about the safety of food products made through biotechnology to allow them to be used/Enough is known about the safety of health products made through biotechnology to allow them to be used

Strongly agree	11
Agree	37
Disagree	24
Strongly disagree	24

Strongly agree	12
Agree	42
Disagree	24
Strongly disagree	18

50. (T) Until more is known about the risks, governments should slow the use of biotechnology/ Government should not encourage the development of biotechnology, because there may be some unknown risks

Strongly agree	45
Agree	31
Disagree	15
Strongly disagree	8

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Strongly agree 14
Agree 27
Disagree 32
Strongly disagree 25

51. (NEW) (3-WAY SPLIT SAMPLE) We have to accept some risk to achieve the benefits of biotechnology like new discoveries that improve the diagnosis and cure of serious illnesses/like new foods that contain vitamins or medicine/like new environmental products that help to clean up the environment

Strongly agree 34
Agree 40
Disagree 10
Strongly disagree 13

Strongly agree 21
Agree 41
Disagree 20
Strongly disagree 17

Strongly agree 29
Agree 45
Disagree 14
Strongly disagree 10

52. (T) (SPLIT SAMPLE) If most scientific evidence says that a particular use of biotechnology is safe, it should be allowed/If the best available scientific evidence says that a particular use of biotechnology is safe, it should be allowed

Strongly agree 26
Agree 52
Disagree 13
Strongly disagree 6

Strongly agree 32
Agree 51
Disagree 11
Strongly disagree 4

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53ab

53. (NEW) (SPLIT SAMPLE) If a biotechnology company conducts research into the safety of a biotechnology product using internationally recognized scientific standards, the product should be allowed in Canada/If a biotechnology company conducts research into the safety of a biotechnology product using internationally recognized scientific standards, the product should be allowed in Canada but only if there is long-term research after it has been approved

Strongly agree	29
Agree	44
Disagree	17
Strongly disagree	8

Strongly agree	49
Agree	36
Disagree	8
Strongly disagree	5

54ab

54. (NEW) SPLIT SAMPLE 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/We have to accept some risk to achieve health benefits from biotechnology research

Strongly agree	48
Agree	36
Disagree	9
Strongly disagree	7

Strongly agree	16
Agree	64
Disagree	14
Strongly disagree	4

POLLARA AND EARNSCLIFFE

55. (NEW) (SPLIT SAMPLE) After all the public debate about GM foods, on balance I think genetically modified foods are generally safe to eat/Since I haven't heard about anyone getting sick from genetically modified foods, I think GM foods are generally safe to eat

Strongly agree	15
Agree	47
Disagree	20
Strongly disagree	14

Strongly agree	21
Agree	38
Disagree	19
Strongly disagree	18

56. (NEW) (SPLIT SAMPLE) I don't think most people in authority are taking the controversy over GM foods seriously enough/I'm sure that Canadian scientists are looking seriously into the safety of GM foods and we will know more soon

Strongly agree	36
Agree	39
Disagree	14
Strongly disagree	5

Strongly agree	30
Agree	50
Disagree	10
Strongly disagree	5

57. (NEW) (SPLIT SAMPLE) I am confident that the testing system used to ensure that foods imported into Canada is effective/I am confident that the testing system used to ensure that genetically modified foods imported into Canada is effective

Strongly agree	18
Agree	43
Disagree	20
Strongly disagree	14

Strongly agree 14
Agree 43
Disagree 23
Strongly disagree 14

58. (NEW) From what I know, genetically modified food provides me with few benefits over non-genetically modified food, but it provides many more risks/ I don't think I know any more about GM foods now than I did a year ago

Strongly agree 27
Agree 34
Disagree 20
Strongly disagree 10

Strongly agree 38
Agree 27
Disagree 20
Strongly disagree 13

59. (NEW) (3-WAY SPLIT SAMPLE) If genetically modified foods cost less, I would buy them instead of non-genetically modified foods/ If genetically modified food reduced the need for chemical pesticides in farming, I would purchase GM food instead of non-GM food/ If genetically modified foods would improve my health by adding things like vitamins or medicines, I would buy them instead of non-genetically modified foods

Strongly agree 12
Agree 24
Disagree 20
Strongly disagree 41

Strongly agree 34
Agree 38
Disagree 12
Strongly disagree 7

Strongly agree 27
Agree 35
Disagree 20
Strongly disagree 16

POLLARA AND EARNSCLIFFE

60ab 60a 60b

60. (T) (SPLIT SAMPLE) Government and private sector researchers should work together on new inventions and applications in the biotechnology field/Government should regulate biotechnology, but the private sector should do the actual research and development

Strongly agree 54
Agree 34
Disagree 5
Strongly disagree 6

b

Strongly agree 34
Agree 38
Disagree 15
Strongly disagree 10

61. (T) Some people are confident that enough is being done to study and monitor the risks associated with biotechnology. Others are worried that not enough priority is being attached to this. Which of these points of view is closest to your own?

Enough being done 32
Not enough priority attached 62

62ab

62. A. (NEW) (SPLIT SAMPLE) The federal government has passed laws to regulate biotechnology products for health safety. Does knowing this fact make you much more comfortable, somewhat more comfortable, no more or less comfortable, somewhat less comfortable or much less comfortable regarding the impacts of biotechnology products?

Much more comfortable 10
Somewhat more comfortable 50
No more or less comfortable 29
Somewhat less comfortable 7
Much less comfortable 2

b. The federal government has passed laws to regulate biotechnology products for environmental safety. Does knowing this fact make you much more comfortable, somewhat more comfortable, no more or less comfortable, somewhat less comfortable or much less comfortable regarding the impacts of biotechnology products

Much more comfortable 9
Somewhat more comfortable 51
No more or less comfortable 28
Somewhat less comfortable 7
Much less comfortable 4

POLLARA AND EARNSCLIFFE

63. (NEW) Canadians have said that they would like more information about biotechnology made available to them. Of the following, which sources would you be **very likely** to get information from? (ROTATE, check for all that say yes)

Television 84

Newspaper 80

Radio 65

Pamphlet in the mail 68

Pamphlet at grocery store 64

Web site produced by the Government of Canada 59

Web site produced by biotechnology companies 44

Toll-free number provided by companies that produce biotechnology products 36

Toll-free number provided by the Government of Canada comfortable 51

What I would like to do is briefly describe how approval processes for biotechnology products work, and I want you to tell me whether it makes you very confident, somewhat confident, not very confident or not at all confident about the safety of these products? (ROTATE, ASK EACH RESPONDENT ***ONE*** OF THE THREE FOLLOWING QUESTIONS) ***Please emphasize the product mentioned in the first line of each question.***

bAabC

64. A. (NEW) In order for a ***genetically modified food*** product to be approved in Canada, first the federal government sets safety standards that the product must meet. Next, scientific research on the product is conducted for 5-10 years, by scientists who work for biotechnology companies. The companies then submit their research back to a team of government scientists. This team then evaluates the research to determine whether the research is sound, and whether it has met government's safety standards. Does that system make you feel very confident, somewhat confident, not very confident or not at all confident about the safety of these products?

Very confident 28

Somewhat confident 52

Not very confident 14

Not at all confident 5

B. (NEW) In order for a ***genetically modified tree*** to be approved in Canada, test research is conducted in laboratories, greenhouses, and in natural environments, where scientists from government and biotechnology companies work together to measure how the modified tree is developing, and what the effects on the forest, soil, and surrounding ecosystem are. After about 10 years of research, if no ill effects on the environment are found, the product would be approved for use in Canada. Does that system make you feel very confident, somewhat confident, not very confident or not at all confident about the safety of these products?

Very confident	34
Somewhat confident	49
Not very confident	11
Not at all confident	5

C. (NEW) In order for ***health products (like drugs)*** developed using biotechnology to be approved in Canada, first the federal government sets standards for safety and effectiveness that the product must meet. Next, scientific research is conducted on the products for about 10 years by scientists who work for the biotechnology companies. This research is submitted back to a team of government scientists, which evaluates the research to determine whether the research is sound, and whether it has met government's safety standards. Does that system make you feel very confident, somewhat confident, not very confident or not at all confident about the safety of these products?

Very confident	28
Somewhat confident	61
Not very confident	7
Not at all confident	3

POLLARA AND EARNSCLIFFE

Health and Environment Focus Groups
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)

- 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. Please write them down on a piece of paper.
- How do you feel when you hear the term biotechnology? What kinds of reactions do you have? Please tell us what you wrote down, and where you developed these impressions.
- What about genetic modification? How does that make you feel? What are your impressions? (If different than biotechnology) Why?
- Biotechnology has applications in a number of fields. Please write down examples of products or applications that you have heard about. (PROBE: Health/Environment/Food)

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 genetic modification or bio-engineering.

- How often do you hear about biotechnology or genetic modification? Do you think that people are talking about it more than a few months ago? What would you say is the main source of this information? Do you hear more about this from government, from the industry, or from interest groups?
- Among the things you have heard, what has been the most notable to you?

- 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?

- Thinking about what you have been hearing lately, does it tend to be more positive, or more negative about the impact and potential impact of biotechnology or genetic modification?

Benefits and Risks (10 min)

As the discussion has suggested, the field of biotechnology raises issues of risk and benefit to society. I'm going to ask a few questions that attempt to get at how you feel about what the risks and benefits are.

- From what you know, what are some of the major benefits of this field of endeavour?

- What are some of the major risks or drawbacks? (Probe specifically: Health/Food/Environment/Ecosystem)

- What is your greatest concern when it comes to biotechnology or genetic modification?

- (RAISE IF NOT MENTIONED IN PRECEDING DISCUSSION) What are some of the things that should be taken into account when making decisions about biotechnology? Probe if not raised (what about moral and ethical issues?) What role should moral and ethical issues play in the decision-making process? (If moral and ethical, what would be the appropriate course of action? How would you determine what should be allowed and disallowed?)

Perceptions - Roles and Responsibilities of the Federal Government (20 min)

- From what you know, what are the responsibilities of the federal government in the area of biotechnology? (PROBE economic/ health/ environment/ safety/ enforcement/ scientific research/long-term research)

- From what you know, how effective would you say the government is at carrying out these roles? (PROBE directly on health/environment/food safety) Why do you say that?

- 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? If yes, what are they? What government departments are responsible? What do you think of these laws? How do you feel about these processes?

- Once a food/health/environmental product developed using biotechnology has been evaluated and approved by the federal government, would you feel safe using it/serving it to your family?

- How do safety standards for most non-biotech products in Canada measure against other countries? Why do you think that?

- How do you feel about the amount of resources the federal government dedicates to this type of scientific research?

GM Foods (15 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?
- If you had to guess, what percentage of the food we eat on a daily basis do you think contains genetically modified ingredients or comes from plants that have been genetically modified? Why do you say that?
- About two-thirds of processed food contain GM ingredients. What impact does that have on your views of genetically modified foods? Why do you say that?
- From what you know, what is the main benefit of GM food? What is the main drawback?
- Did you know that the newest GM foods promise to provide nutritional/medicinal benefits (e.g. enhanced levels of vitamins and minerals)? How does knowing that make you feel about these products?
- What if GM food were going to cost less than non-GM food? Would that influence your view? Would you do anything different at the grocery store?
- 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?

The Regulatory Approval Process (15 min)

What I would like to do is briefly describe how approval processes for biotechnology products work, and I want you to tell me how confident this system makes you feel about the system and the products that are approved – (**ONE** OF THE THREE WILL BE ASKED PER GROUP, MORE IF TIME PERMITS).

- In order for a ***genetically modified food*** product to be approved in Canada, first the federal government sets safety standards that the product must meet. Scientific research on the product is conducted for 5-10 years, by scientists who work for biotechnology companies. The companies then submit their research back to a team of government scientists. This team then evaluates the research to determine whether the research is sound, and whether it has met government's safety standards. The basis of this system is substantial equivalence – where if the food meets the same criteria and is as safe as like "non-GM" products, the product will be approved. What do you think about this process? How does it affect your level of confidence?
- In order for a ***genetically modified tree*** to be approved in Canada, test research is conducted in laboratories, greenhouses, and in natural environments, where scientists

from government and biotechnology companies work together to measure how the modified tree is developing, and what the effects on the forest, soil, and surrounding ecosystem are. After about 10 years of research, if no ill effects on the environment are found, the product would be approved for use in Canada. What do you think about this process? How does it affect your level of confidence?

- In order for ***health products (like drugs)*** developed using biotechnology to be approved in Canada, first the federal government sets standards for safety and effectiveness that the product must meet. Next, scientific research is conducted on the products for about 10 years by scientists who work for the biotechnology companies. This research is submitted back to a team of government scientists, which evaluates the research to determine whether the research is sound, and whether it has met government's safety standards. What do you think about this process? How does it affect your level of confidence? When you hear that there are standards set by the federal government, does that increase your confidence, or not?

Priorities for the Future (25 min)

- What would you say are the priorities the federal government should pursue in the field of biotechnology going forward? (hand-out, ask people to rank priorities). Discuss top 2 and bottom 2 priorities for each person, why those were chosen.
- What would you say is the ideal set of roles for the federal government in this area? Can it do all of these? Should it do some? Which ones?
- Who *should* do the scientific research? (PROBE Government scientists/biotech companies/university researchers). If government sets scientific criteria that tests have to meet, can biotechnology companies do this research? Why/Why not?
- What aspects of research should be pursued most strongly? (PROBE: Health impacts/environmental impacts/food safety impacts)
- Should one department have overall responsibility, or should different departments have their own areas of responsibility, depending on their area of expertise (health, environment, agriculture, industry)?
- Should Canada get involved in international agreements to regulate biotechnology, or should we make and implement our own rules? (IF OWN RULES) What if this meant that other countries might get competitive advantages over us in this area? What if this meant that certain products might take longer to get to us, because Canadian regulators would duplicate research done in other countries before?
- 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. Which role do you think the federal government is putting

more emphasis on today, or is it putting equal emphasis on both? What role SHOULD it place emphasis on now/ in the future?

- There are a number of areas where the federal government invests in research and development. There is basic science, which increases knowledge and can lead to new discoveries. There is research that provides scientific evidence to help support decision making and the regulatory process. And there is research with more immediate economic benefits that could lead to job creation. Which of these areas (if any) should be the government's main funding priority? Why?

- Do you think that the government should allocate most of its resources for scientific research and testing to government scientists (at Health Canada or the Canadian Food Inspection Agency) or to scientists that apply for grants to do research?

- Some people say until more is known about the risks, governments should slow the use of (or stop) biotechnology. Others say we have to accept some risk to achieve the benefits from biotechnology research. What do you think is the best approach? Please explain your point of view?

Public Interest and Involvement (10 min)

- Who should be the main decision maker about biotechnology products? PROBE IF NECESSARY AFTER DISCUSSION ENSUES: Should scientists/policy makers/advocates/ordinary Canadians be the primary decision-makers about biotechnology, or some combination? If ordinary Canadians get involved, how should they be involved?

- If there were more information on biotechnology available, how would you want to receive it? PROBE IF NECESSARY AFTER DISCUSSION ENSUES (Would you want it sent directly to you (through the mail) or made available when you want it (on a web site, or toll-free number)?

- What would you do if more information regarding biotechnology were made available, to you? (PROBE IF NECESSARY AFTER DISCUSSION ENSUES) Immediately take the time to seek out that information and learn more OR get the information at a time when you thought it was important to know more?

- If you were to hear about biotechnology, which sources would be the most credible to you? (Probe university scientists/biotech company scientists/environmental organizations) If university or government scientists got some of their money from biotech companies, would this change your view? Why or why not?

What is the best way to get information out to Canadians about this subject? Do you recall seeing anything recently from government? From others? What mediums would be most useful to you (PROBE):

- Television
- Newspaper

- Radio
- Pamphlet in the mail
- Pamphlet at grocery store
- Web site produced by the federal government /biotechnology companies
- Toll-free number provided by companies that produce biotechnology products/by the federal government
- Other