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Product Safety Regulation and the Hazardous Products Act

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Economic Council of Canada

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PRODUCT SAFETY REGULATION AND THE HAZARDOUS PRODUCTS ACT

by
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The findings of this Technical Report are the personal responsibility of the author, and, as such, have not been endorsed by members of the Economic Council of Canada.

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RÉSUMÉ

Dans le présent document, l'auteur examine quelques questions générales relatives au rôle de l'État dans le domaine de la sécurité des produits, ainsi que certains problèmes particuliers que soulève l'application au Canada de la Loi sur les produits dangereux. Il met d'abord l'accent sur la raison d'être de l'intervention gouvernementale dans les marchés des produits et examine les nombreux moyens disponibles pour réaliser les objectifs à atteindre en matière de sécurité des produits. L'intervention de l'État peut être source d'importants avantages lorsque les renseignements font défaut et que les consommateurs prennent des risques beaucoup plus grands qu'ils ne le feraient s'ils étaient mieux informés. Il faut comparer ces avantages aux frais d'administration et d'application de la Loi, aux effets restrictifs des contrôles publics sur les choix des consommateurs, ainsi qu'aux conséquences indirectes possibles, par exemple, pour l'investissement ou la structure du marché. L'organisme de réglementation, pour sa part, fait face à plusieurs défis : identifier les domaines où les consommateurs assument involontairement des risques pouvant avoir de graves conséquences; déterminer la meilleure forme d'intervention ainsi que le degré optimal de rigueur lorsqu'il y a application de normes, et s'assurer que l'intervention envisagée fera sentir son action dans la "réalité", c'est-à-dire dans des conditions qui tiennent totalement compte des réactions des consommateurs et de tous les effets indirects.

La Loi sur les produits dangereux, adoptée en 1969, est une loi fédérale destinée à assurer une protection étendue contre les risques que recèlent certains produits et auxquels les consommateurs sont exposés. Dans la deuxième partie de son document, l'auteur examine un certain nombre de produits

réglementés par cette loi -- substances dangereuses, sucettes, hochets, lits d'enfant, casques de hockey, verre de sécurité, jouets, dispositifs de retenue pour enfants et bouteilles de boissons gazeuses -- et étudie certains aspects généraux de l'administration et de l'application de la Loi par le ministère fédéral de la Consommation et des Corporations. Dans son analyse, l'auteur laisse entendre que cette loi joue un rôle important et qu'elle réussit à régler certains problèmes auxquels d'autres mesures, comme l'autoréglementation et le principe de la responsabilité, ne peuvent apporter une solution appropriée. Toutefois, bien que les faits montrent que la réglementation sur la sécurité des produits, au Canada, ait été la source d'importants avantages, ils indiquent aussi qu'on n'a pas totalement envisagé toutes les possibilités de réduire les risques avec les moyens engagés. Le ministère n'a pas essayé de faire une analyse systématique de diverses autres options, de façon à appliquer ses ressources aux domaines pouvant rapporter les plus grands avantages nets. Les études de cas soulèvent certaines questions au sujet du choix de l'instrument à utiliser, et laissent entendre que dans certains domaines, des normes moins restrictives auraient été plus appropriées. Dans certains cas, on n'a pas tenu suffisamment compte des coûts et autres effets de la réglementation, dont certains peuvent influer indirectement sur la réalisation des objectifs en matière de sécurité.

L'auteur présente diverses recommandations en vue d'améliorer l'efficacité de la réglementation sur la sécurité des produits. Il propose l'établissement d'un système d'information qui permettrait au ministère d'être plus efficacement averti de l'existence de dangers importants et d'axer son analyse et ses recherches sur les produits qu'il peut le plus efficacement atteindre. Dans la dernière partie du document, l'auteur souligne la nécessité d'une analyse systématique de tous les

règlements qu'on se propose de mettre en vigueur, afin de déterminer des priorités en matière de réglementation. Il recommande une grande ouverture d'esprit et de nombreuses consultations dans le cas de règlements qui comportent des coûts importants ou qui sont susceptibles de devenir une source d'inquiétudes du fait de leur incidence sur certains groupes de la société ou à cause de la nature des questions soulevées. Par ailleurs, il préconise instamment d'envisager tout le domaine de sécurité des produits dans une perspective plus large, ce qui permettrait d'englober la gamme complète des différents moyens disponibles en vue de réduire les risques pour les consommateurs. De façon plus générale, l'auteur souligne qu'une estimation de toutes les possibilités de répartir les ressources entre les activités qui concourent à la réduction des risques peut contribuer à une plus grande diminution, dans l'ensemble, des risques auxquels la population est exposée.

SUMMARY

This paper examines general issues related to the role of government in the product safety area, and specific questions that arise from Canada's experience under the Hazardous Products Act. The first part of the paper focuses on the rationale for government intervention in product markets and examines the broad choices that are available to achieve product safety objectives. Government intervention can provide important benefits where there are information gaps causing consumers to assume significantly greater risks than they would knowingly accept. These benefits must be balanced against the costs associated with administration and enforcement, with the restrictive effect of government controls on consumer choice, and with any indirect impacts on, for example, investment or market structure. The challenges facing the regulator are to identify areas where consumers are involuntarily assuming risks with potentially serious consequences; to determine the most appropriate form of intervention, and the optimal degree of stringency where standards are employed; and to ensure that the proposed action will have the intended impact in the "real world" when consumer response and all indirect effects are fully taken into account.

The Hazardous Products Act, which was passed in 1969, is the federal statute designed to provide broad protection against the product risks to which consumers are exposed. In the second part of the paper we examine a number of items regulated under the Act -- hazardous substances, pacifiers, rattles, cribs, hockey helmets, safety glass, toys, child restraints and soft drink bottles -- and look at some general aspects of the administrtion and enforcement of the Act by Consumer and Corporate Affairs Canada. The analysis suggests the Act is filling an important role and successfully responding to problems which alternatives, such as self- regulation and the system of liability law, cannot adequately address. But while the evidence indicates that product safety regulation in Canada has produced significant benefits, it also suggests that the opportunities for reducing risks from the given commitment of resources have not been fully realized. The department has not attempted to systematically

analyze alternative options so as to target resources to areas offering the greatest net benefits. The case studies raise questions about the choice of instrument, and suggest that in some areas where standards have been adopted a less restrictive approach would have been more appropriate. In some cases there has been an inadequate consideration of the costs and other effects of regulation, some of which may indirectly influence the achievement of safety objectives.

A number of recommendations are made to improve the efficiency of product safety regulation. It is proposed that an information system be established to help ensure that the department is alerted to existance of important product hazards and that it focusses its analysis and research on those product risks which are the most promising candidates for government intervention. The final section emphasizes the need for a systematic analysis of all regulations which are being seriously considered. The results of such analyses should form the basis for the establishment of regulatory priorities. There is a recommendation for a high degree of openness and consultation in the case of regulations which involve substantial costs, or which are likely to be of concern because of their impact on particular groups or the nature of the issues raised. And the paper urges the adoption of a broader perspective, which would allow for a consideration of the full range of options which are available to reduce consumer risks. At a more general level, it is noted that an appreciation of all the choices which are available for allocating resources among risk-reducing activities can contribute to a greater overall reduction in the risks to which the population is exposed.

INTRODUCTION

Since the mid-1960 s there has been an increased commitment by governments to reduce the health and safety risks to which consumers are exposed. This has been reflected at the federal level by the enactment of legislation such as the Motor Vehicle Safety Act (1970) and the Motor Vehicle Tire Safety Act (1976), the major amendments to the Food and Drugs Act, the Radiation Emitting Devices Act (1970), and the Hazardous Products Act (1969). This paper looks at the general role of government in the product safety area and explores in some detail Canada's experience under the Hazardous Products Act the federal statute intended to provide broad protection against the product risks facing consumers.

The first part of the paper addresses some general conceptual issues the questions of when and how governments should intervene in product markets are discussed some important factors bearing on the costs and benefits of product regulation are considered, and alternatives to regulation as means of achieving product safety goals (i.e., liability law and voluntary standards) are examined. The lessons and guidelines that emerge from this general discussion are applied in the second part of the paper to gain a perspective on the strengtns and weaknesses of regulation under the Hazardous Products Act. There is an attempt to gauge the overall effectiveness of the Act and to assess the efficiency and effectiveness of specific product safety regulations. Aspects of the administration and enforcement of the Act are then examined with a view to their influence on the overall goal of achieving the maximum reduction in consumer risk from a given commitment of resources. The final section provides recommendations which are thought could contribute to an improved and more efficient system of product safety regulation.

PART I

THE CONCEPTUAL ISSUES

A) Product Safety under Perfect Competition

In a perfectly competitive market the issue of product safety would be resolved by the decisions of individual producers and consumers. The questions the consumer confronts in the safety area are a subset of the more general decision-making problem he faces of how to allocate his wealth and his time to maximize welfare. In "consuming" safety, as in consuming other goods and services, the individual faces a range of choices. He can restrict his purchases to products which are relatively risk-free or in which the high degree of "built-in" safety keeps risks to a minimum. He can purchase more hazardous goods but take considerable care in their operation and use, thereby in a sense "manufacturing" increased safety with his own time and efforts. The consumer can alternatively buy more risky products and purchase insurance to protect himself against the undesired degree of risk. The choice will vary between individuals depending, among other things, on their attitude towards risk and their efficiency in producing safety. But when markets are perfectly competitive, when there are no information problems, and when transaction costs are negligible, the right degree and mix of safety will be provided. The market will supply a range of products to suit varying tasks for different price-safety combinations. Individuals who can provide safety more efficiently than the market through their own efforts will do so, and insurance companies will offer protection against that residual risk which cannot be efficiently eliminated by the efforts of either producers or consumers.

The market will produce this highly efficient outcome whether liability for product accidents rests with producers or

consumers. And the results are not affected where a product inflicts accidental injuries on a third party. In a seminal article Coase has shown that liability is irrelevant where information and transactions costs are zero.[1] If transactions costs are negligible producers, consumers and affected third parties will bargain among themselves and ensure that the optimal degree of accident avoidance is pursued. Under such circumstances, regardless of the assignment of liability, accidents will be prevented by the party who can do so at lowest cost, where prevention is warranted (ie. where the costs of the accident exceeds the costs of prevention). However, under producer liability the application of the Coase theorem requires that sellers be able to determine which consumers are more accident-prone and to price discriminate accordingly. Walter Oi has shown that where information is asymmetrical, with consumers possessing perfect information about product risks but producers lacking information on consumers' treatment of risk, consumer liability is required for an efficient outcome.[2]

Under a system of caveat emptor with perfect consumer information the price of relatively risky products would incorporate a discount to compensate for the additional cost to consumers of using these products over less risky alternatives. The discount for risky products provides manufacturers with an incentive to eliminate the hazards associated with their goods. Producers could be expected to respond by enhancing the safety of their products up to the point where the increased cost of further upgrading is no longer offset by the higher market price which the product could command. The question of how much safety should be provided by producers would thereby constitute one of the multitude of questions the market would answer in the course of allocating the economy's scarce resources among competing wants. In this hypothetical world of perfect competition product risks would be reduced as long as the value of risk reduction exceeded the associated increase in manufacturing costs, and

through the joint effects of consumers and producers to reduce risks the total of accident costs and accident prevention costs would be minimized.

B) Market Failures

There is evidence that markets do take account of some risks. Various studies have identified the existence of a wage premium for hazardous work. In one of the most widely cited of these studies it has been estimated that workers require an extra $136 to $260 per year to accept an additional one-in-1000 risk of death.[3] In the case of some hazardous consumer products such as power tools, one often has the option of paying a premium for an upgraded model with various safety features. In such circumstances where the risks associated with a product are clear and obvious the market generally does respond by offering consumers the opportunity of purchasing higher quality and safer products. For the most part, however, risks are not obvious and product markets depart considerably from the perfectly competitive version.

A major adjustment to the hypothetical model must be made to take account of the fact that the information required for efficient decision-making is costly and often difficult to acquire. With information a scarce resource, the demands on the individual consumer's time and the range of possible tradeoffs are increased. Time can be devoted to earning additional income which, among other things, will enable the purchase of safer products and increased accident insurance; time can be spent in the cautionary use and handling of potentially hazardous products; and time can be used to gather information on products and their defects and hazards. A rational consumer could be expected to pursue information up to the point where the marginal gains from more informed decisions are just balanced by the marginal costs of gathering and processing information. Where information is costly, rational consumer choices will therefore be made on the basis of highly imperfect information.[4]

Information gaps distort the provision of safety at several points in the production process. When consumers underestimate product risks they will not pay the full premium that is warranted by product improvements which reduce the degree of risk. Under systems of consumer liability or imperfect systems of producer liability manufacturers may thereby have little incentive to reduce product hazards. Uninformed consumers will also devote less time to the "production" of safety on their own, and they are likely to voluntarily buy less insurance than they would if they fully recognized the risks to which they were exposed. Where producers do have an incentive to reduce product risks, information problems may confound their efforts to develop a less hazardous product. And insurance companies may not be able to provide the appropriate amount of protection because of information costs associated with separating individuals into homogeneous risk pools and contending with problems of moral hazard.

A number of factors contribute to information problems in the safety area. Most risks are not apparent to the observer. Moreover, accidents are statisically uncommon events so individual experience provides a totally inadequate basis for assessing risks. Information on hazards, unlike other product information, is not forthcoming from producers; while one might expect firms to highlight the defects of their rivals' products, libel laws, custom and the concern that negative advertising may reflect badly on the product group in general has discouraged this type of negative advertising.[5] While the potential gains from gathering information on product hazards may be significant, individuals who do not suspect the high risk nature of a product would not be inclined to invest significantly in information activities. There is, as well, evidence that individuals have considerable difficulty processing information about small probabilities.[6] This suggests that, in many cases, even if the relevant information on accident risks was available, consumers would still be unable to make informed decisions.

Product markets depart from the competitive norm also because of market failures that are due to the phenomenon of externalities. Transaction costs are not insignificant and they will often prevent an agreement from being worked out between those affected by an activity and the parties responsible for the activity. Where the decision of consumers or producers has implications for the welfare of others which are not taken into account inefficiencies will arise. Dangerous goods may threaten others as well as the user or purchaser so they can involve direct physical externalities. External effects of a different nature arise as well, however, because of the institutional arrangements of society to care for and compensate individuals who are injured. Health and hospital insurance and government-funded disability and welfare programs pass the costs of accidents from the individual to society as a whole. As a consequence of both physical and financial externalities individuals do not face the full costs associated with their choice of risky products.

The problem of financial externalities referred to above arises because premiums for government social and health insurance programs are not related to an individual's requirements for the relevant service. However, even private insurance schemes are often far from fully experience rated. The problem in the latter case is linked to the issue of information costs. The prohibitive cost of distinguishing between different consumers on the basis of their cautionary approach to risk requires the insurance company to set a uniform rate for most product risks or, at most, to group consumers into a few very broad classes.[7] Reckless behaviour by some individuals will lead to higher rates for all individuals within the class. The former group thereby imposes a financial external diseconomy on more informed and more cautious consumers. Hinich has developed a model of food regulation in which the existence of financial externalities provides the rationale for government

regulation.[8] In this model the informed consumers press for government to ban risky products so that they are no longer faced with the costs of subsidizing the medical costs incurred by the uninformed consumers of food products.

Governments may be able to play an important role in correcting market distortions, but the mere identification of a market failure does not provide a sufficient basis for government intervention. Externalities and information deficiencies are aspects of many markets. It is necessary to look at the degree of market failure and compare the consequences with the costs of intervention. The case for intervention will be stronger in some product markets than in others. Different forms of intervention have different costs and different implications in terms of providing safety and meeting other broad social objectives.

C) The Rationale for Government Intervention

The case for government intervention in product markets arises both from the existence of significant information gaps and the expectation that these gaps can be most efficiently filled by the government sector. As Davis and Kamien have indicated product information is analagous to a public good: the "consumption" of this information by one individual does not diminish the availability or usefulness of the knowledge for others.[9] Since the marginal cost of providing information to another individual is close to zero the efficient pricing of information would require near-zero prices. Where information is sold at a price designed to recoup the costs of production its dissemination is undesirably restricted. As a result of the rather unique nature of information the private market produces a less than optimal supply. Nelson and others have argued that this gap gets at least partially filled by the sales efforts of producers.[10] But this clearly does not apply to information about product hazards. Here problems concerning information

availability apply with particular force and there would appear to be the possibility for significant gains from public sector support and involvement.

The advantages that arise from public sector support for, and provision of, information on product hazards will, in some cases, extend to a more restrictive policy of product regulation. The provision of information on product risks will in many cases have little influence on consumer behaviour. The costs of processing the resulting information will often be prohibitive and, as noted, individuals have a great deal of difficulty incorporating information on small probabilities. More direct government involvement through product bans or the establishment of product standards will be more effective and offers the possibility of savings not only in information gathering but also - and perhaps more importantly - in information processing costs. The transfer of some of the consumers' decision-making functions to the government and the resulting restriction in choice will lead to a decline in consumer welfare. However, this loss will not be significant where consumers would make basically similar decisions on the basis of accurate information on product risks, and where the government sector is essentially giving expression to a "common preference".

Cornell, Noll and Weingast describe the formation of a regulatory agency as an attempt to realize certain information gathering and processing economies through a delegation of functions.[11] Regulation is "the ultimate form of delegation". In assessing the desirability of a regulatory institution, Cornell et al., see the essential question as "whether the costs it saves on information generation and interpretation offset the costs it imposes because its standards are not consonant with the differing tastes and perceptions of risk of those it is trying to protect".[12] Where consumer preferences are not reasonably similar regulation will effectively restrict choice for many individuals and create major

consumption inefficiencies. At some point the resulting losses in consumer welfare will more than offset the savings in information costs that are provided by regulation.

Colantoni, Davis and Swaminuthan illustrate the nature of the possible welfare gains that are available from regulation where consumers misperceive the quality characteristics of goods.[13] Their analysis is based on Lancaster's model of consumer choice in which utility is derived from the properties or characteristics which goods possess rather than the goods themselves. Colantoni et al., describe how a misperception of the transformation between commodities and characteristics can lead the consumer to make inefficient choices that fail to maximize his utility. In these circumstances regulation can have the beneficial effect of removing from the market certain alternatives that consumers "should" not have chosen, and would not have chosen if they had the required knowledge. It is necessary to weigh the resulting gain against any welfare loss that may result because regulation also eliminates options from the market that the fully informed consumer would have purchased. The latter individual, unlike the imperfectly informed consumer, cannot be helped, but can be made worse off by regulation.

The case for regulation can be illustrated in terms of a more general model of the demand for product characteristics developed by Rosen.[14] In contrast to Lancaster, Rosen assumes that goods are indivisible (i.e., two 6-foot cars are not equivalent to one 12-foot car). The simplifying assumption that brands are available for a continuous range of characteristics is also employed. Rosen focuses on a set of goods with characteristics $Z_1, Z_2, \ldots, Z_n$. Representing all other goods by Y (which is set equal to one dollar) and defining K as income, the consumption decision may be stated as:

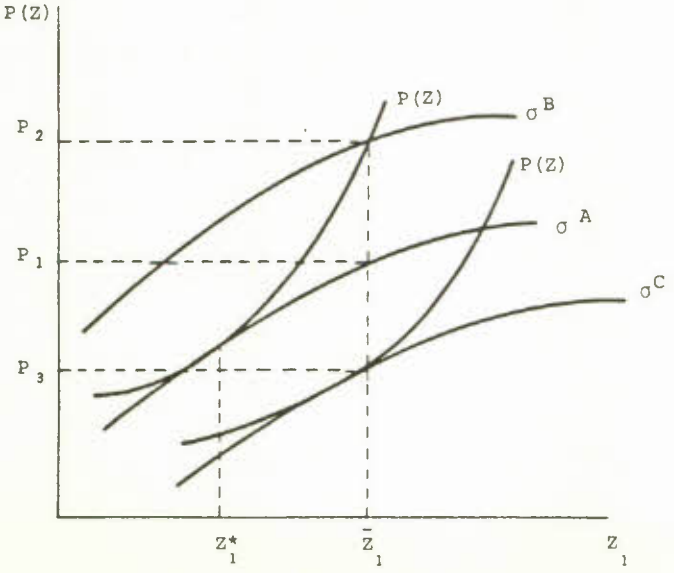
Maximize $U(Z_1, Z_2, -- Z_n, Y)$

Subject to $P(Z_1, Z_2, ---, Z_n) + Y = K$

$P(Z_1, Z_2..., Z_n)$ represents the price of the good yielding characteristics $Z_1, Z_2, ---, Z_n$ which is actually purchased. The characteristic prices are implicitly revealed in the market through a comparison of the market price with the amount of the particular characteristics embodied in the good. A bid function $\sigma(Z;u,y)$ indicates the amount the consumer is willing to pay for a given set of characteristics at a given utility index and income. If there are two characteristics, Z_1 and Z_2, for example, one of the indifference curves defined by the bid function would express the amount the consumer would be willing to pay for alternate amounts of Z_1 at a constant utility level U^* given the value of $Z_2 = Z_2^*$. The market offer curve $P(Z)$ defines the minimum price the consumer must pay in the market for different degrees of Z_1 given $Z_2 = Z_2^*$. Given that Z_2^* is the optimal amount of Z_2, utility is maximized when tangency is obtained between the consumer's indifference curve and the offer curve. At the optimal quality configuration the marginal utilities of characteristics are proportional to their marginal prices.

Figure 1 depicts the consequences of a minimum quality standard which forces the consumer to purchase at least $\bar{Z}_1$ units of a specific characteristic.

FIGURE 1



The consumer bought Z_1^* units prior to the establishment of a quality standard, and the requirement that he purchase $\bar{Z}_1$ moves him from σ^A to σ^B and ostensibly represents a loss in welfare. A very different conclusion emerges, however, when we consider the possibility that the consumer is acting on the basis of incomplete and imperfect information. Let us suppose that Z_1 represents a range of auto safety components designed to reduce the risk of injury to the consumer (ignoring possible externalities); an increase in Z_1 can be translated into a decline in the probability of auto injury. Consumers may underestimate the probability of an auto accident, and as a result may fail to appreciate the benefits associated with various safety components. In terms of Figure 1 the consumer incorrectly perceives the market price of risk-reducing features to be that established by the offer curve P(Z); his decision to consume Z_1^* is based on this misperception of the price of increased safety. In Figure 1 the regulated standard is set at the point where the true offer curve $P(Z)'$ is just tangent to the consumer's bid function σ^C; in other words, under regulation he is consuming the optimal quality of Z_1. In this case regulation corrects the consumer's misperception and leads to an increase in welfare equivalent to $P_1\ P_3$.[15]

The theoretical discussion in this section suggests in general terms that a regulatory agency can play a useful role in promoting product safety. While there are tradeoffs to be considered the significant lack of information on product hazards raises the possibility that important gains can be achieved from government intervention. The discussion does not suggest, however, that a regulatory institution is the only, or necessarily the most important, vehicle to achieve society's goals in the safety area. Indeed it is clear that society has a number of broad objectives for its system of accident prevention.[16] There is the basic goal of reducing the number and severity of accidents combined with the costs of achieving this reduction in accidents; in other words, to approach the perfectly

competitive solution in which the value of resources (human and material) absorbed by accidents and accident-preventing activities is kept to a minimum. Importance is also attached to reducing the costs accidents impose on their victims; a range of risk-spreading and redistributive programs exist primarily to contribute to this general objective. Accidents and accident-preventing activities have other broad distributive consequences and these may require consideration. There is in addition the legal issues that arise in those circumstances where accidents call into question individuals' basic rights, and challenge our sense of natural justice. A number of programs and mechanisms have been developed to help attain these general objectives. Public medical and hospital insurance achieves an important degree of loss-spreading. Liability law helps confront the issues of justice that arise in some accidents, and has implications as well for the overall degree and mix of safety that is produced. Government regulation, therefore, is properly viewed as one component of a system that is designed to address a number of partially interrelated safety objectives.

D) Involuntary Risks

From the discussion in the previous section a numer of inferences can be drawn with respect to the general question as to when governments should directly intervene to promote product safety and how, or in what form, they should intervene. It is clear that the role of a product safety agency is not simply to prohibit the production of goods that contain hazards or to prevent people from taking risks; rather its activities should be aimed at preventing consumers from buying products they wouldn't have bought if they had accurate information about the risks involved. The basic problem is not that unsafe products exist, but that because risks are underestimated, or not foreseen, incorrect decisions are made and inadequate market responses result. This suggests that the central focus of government activities should be on what might be called "involuntary risks".

The National Commission on Product Safety in the U.S. directed its concern at what it termed "unreasonably hazardous products". The definition of an "unreasonable hazard" proposed by Corwin Edwards and endorsed by the Commission indicates the importance given to involuntary or hidden risks:

> Risks of bodily harm to users are not unreasonable when consumers understand that risks exist, can appraise their probability and severity, know how to cope with them, and voluntarily accept them to get benefits that could not be obtained in less risky ways. When there is a risk of this character, consumers have reasonable opportunity to protect themselves; and public authorities should hesitate to substitute their value judgements about the desirability of the risk for those of the consumers who choose to incur it.
>
> But preventable risk is not reasonable (a) when consumers do not know that it exists; or (b) when, though aware of it, consumers are unable to estimate its frequency and severity; or (c) when consumers do not know how to cope with it, and hence are likely to incur harm unnecessarily; or (d) when risk is unnecessary in ... that it could be reduced or eliminated at a cost in money or in the performance of the product that consumers would willingly incur if they knew the facts and were given the choice. Risks that are unreasonable by this definition of unreasonable seem ... to be common.[17]

This description is useful in highlighting information problems as the basis for government intervention, but as an operational definition it has certain limitations. There are probably very few individuals who engage in sports activities who can reasonably estimate the frequency and severity of accidents in their sport. Most participants in hockey, football, and skiing do know, however, that there is a significant risk involved and they will act accordingly. Government regulation of these activities would be unlikely to yield significant benefits.

There are similarly a range of hazards with which consumers are clearly unequipped to deal. Where these hazards are recognized to be significant, however, the market will respond and remedies will be forthcoming (provided that economic remedies are available). Government intervention is not warranted merely because there is imperfect knowledge of product risks; the policy problem involves the identification of that sub-group within the broader class of products subject to information problems where the extent and significance of information gaps gives major cause for concern.

The concept of involuntarly risk also raises some broader and more basic problems. The notion that consumers are misinformed and therefore incapable of acting in their own best interests has a disagreeable ring of paternalism. The theoretical argument supporting government intervention does not call into question individuals' tastes and values, but asks rather whether the information consumers possess will enable them to satisfy their preferences. But in practice this distinction becomes an exceedingly fine one, since consumer preferences are not known and product characteristics cannot generally be objectively determined. A number of studies have indicated the lack of correlation between the quality of alternative brands of products - as indicated by consumer rating agencies and their prices.[18] These studies were directed at measuring problems of consumer information but they are perhaps more revealing of the general difficulties in understanding and appropriately weighing consumer preferences. The difficulty of identifying information problems does not alter the fact that they exist and in some circumstances provide a legitmate basis for government intervention. They should serve to caution us, however, against a too ready acceptance that risks are 'unreasonable'.

The case for government intervention is most persuasive in those cases where the consumer is almost certain to be unaware that significant hazards exist. Certain hazards cannot be known

without some knowledge of a product's chemical composition or an understanding of its mechanical features. From the appearance of a drain cleaner, for example, the consumer cannot know its highly toxic nature. The consumer is at more of a disadvantage, when it comes to the assessment of health hazards where effects are uncertain and revealed, if at all, long after initial contact. In the case of another group of commodities the risk is not difficult to perceive or understand, but it tends to be ignored, thereby giving rise to essentially the same problem of awareness. There is considerable evidence that people refuse to attend to events where probability is below some threshold level. In a study of disaster insurance Kunreuther found that, contrary to what one might expect on the basis of economic theories emphasizing risk aversion, there was little demand for protection against floods and earthquakes.[19] These disasters resemble product accidents in that the probability of occurrence is very low and the losses that result if they do occur can be very high. The finding in this study that people tend to ignore small probability events is consistent with results of other research emphasizing the concept of bounded rationality.[20] As noted by Kunreuther, "individuals have more pressing things on their minds [than earthquakes, floods and product accidents]. The many decisions that have to be made during their daily routine tend to push these low probability events near the bottom of a very long list, where they are not likely to receive any attention".[21]

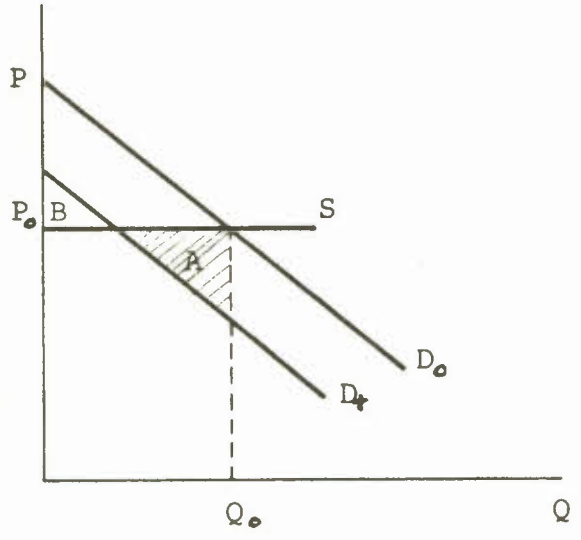
The desirability of government activities in the product safety area can only be judged by assessing the costs and benefits of specific initiatives. The purpose of this discussion has been in a sense, to narrow the target - to indicate the general area where one might expect a significant payoff from government intervention. The basis for government intervention is a lack of information which could cause consumers to assume greater risks than they realize. But the existence of information problems is not a sufficient condition for intervention and regulation is not desirable merely because consumers cannot reliably estimate the

risk probabilities involved. It has been suggested that the emphasis should be on product hazards which are characterized by an especially high degree of consumer ignorance. Particularly important candidates are products in which the nature and probability of the risk is such that the hazard is likely to be unknown or ignored.

E) Alternative Forms of Intervention: Information vs. Product Ban vs. Product Standard

The relative merits of different forms of government intervention can be illustrated by way of the simple model in Figure 2.

FIGURE 2



The intersection of the (assumed) perfectly elastic supply curve with the market demand curve results in Q_o units of the commodity being purchased at price P_o. D_+ represents the curve which would prevail if consumers had complete knowledge about the nature of risks to which they were exposed. The difference between D_+ and D_o is a measure of the additional discount consumers would require to compensate them for that

element of risk which is not perceived. The fact that the product would entail a risk discount suggests that, notwithstanding the existence of medical, hospital and possibly other forms of insurance compensation remains imperfect; there is the possibility of significant losses being sustained in the event of an accident. The shaded triangular area, A, indicates the loss incurred by consumers because of their lack of information on product risks; it is a measure of the amount consumers are paying in excess of that which they are in fact prepared to pay for a product with the given element of risk.

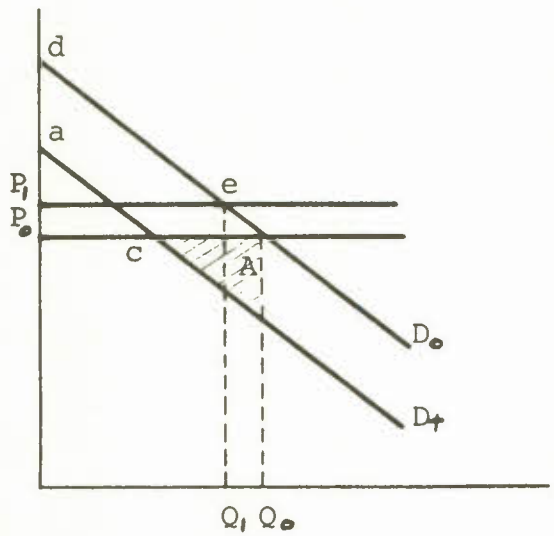
A regulation banning production results in a welfare loss to those individuals who would have purchased the product even with a full understanding of the risks involved. This loss consists of the consumer surplus given the "true" demand curve and it is represented by triangular area B in Figure 2.[22] (If supply was less than perfectly elastic the loss would also include a foregone element of producer surplus, this comprising the triangular area between the horizontal price line and the now upward sloping supply curve.) The gain from a product ban consists of the consumer losses averted, area A, plus any benefits to non-consumers such as might result, for example, from the contribution of a reduction in product risks to lower health insurance premiums. There is an important qualification to this analysis which relates to the effect of a product ban on the behaviour of consumers; if the elimination of the given product causes consumers to increase their purchase of alternatives for which risks are greater and information is even more imperfect then clearly the described gains will not be realized. In this general analysis we are assuming not only that there is a lack of information with respect to the product in question, but that this information problem does not apply - or at least not to anywhere near the same extent - to alternatives on the market.[23]

An information program, which may involve compulsory labelling or efforts to educate the consumer about existing

hazards, can be visualized as an attempt to move the actual demand curve (D_o) towards the true demand (D_+). To the extent that such a program is at least partially effective, consumers would revise their perception about the quality of the product and losses would be reduced. Possibly more important are the developments which could occur over time as producers attempt to respond to the concern about the riskiness of their product and as consumers alter their patterns of usage in response to their revised perceptions about the hazards involved. The response of market participants can lead to resource savings over time well in excess of the costs of gathering and disseminating information.

Figure 3 illustrates the effect of a regulation requiring an improvement in product design or performance.

FIGURE 3



The diagram depicts a situation where the regulators have required product performance to conform to general consumer expectations. The required product change increases "true" demand from D_+ to D_o and causes prices to rise P_o to P_1. As the diagram is constructed, consumer surplus increases from aP_oc to dP_1e as a result of the regulation. In this case the increase in product price is more than offset by the value of the improvement in product quality. Along with the increase in consumer surplus there is an additional gain as

a result of the elimination of the loss to uninformed consumers; this is again indicated by trianglar area A. As before, the assumption must be that the same information problems do not apply to substitute products on the market.

Of the three forms of intervention the informational approach has the greatest initial appeal in that it deals directly with the problem which is the cause of the market failure. It is the least restrictive form of intervention and it does not require the regulators to understand consumer preferences or to assess the impact of changes in product design. An effective information program will restore incentives for the production of safety (by both manufacturers and consumers) and it will offer savings in terms of the resources consumers need to devote to information gathering activities. The basic problem is to determine when an information program can be effective, and to develop a system of cautionary warnings which is neither so weak in its appeal that it is likely to be ignored or so vivid in its illustration of possible hazards that it will cause an overreaction to the risks at hand. In view of the information processing problems referred to earlier the more significant concern must be that information or product hazards will be ignored, though certainly an inappropriately designed information program can lead to the opposite result. One of the earliest regulations introduced by the Consumer Product Safety Commission in the U.S. was successfully challenged in the courts partially on the grounds that the required warning signs (indicating the dangers associated with the incorrect use of a swimming pool slide) could be "so explicit and shocking in their portrayal of the risk of paralysis as to constitute an unwarranted deterrent to the marketing of slides and, hence, their availability to users".[24]

In general one might expect that consumers will continue to collect and analyse information as long as the perceived marginal benefits of these activities exceed their marginal costs. The circumstances in which an information program is likely to be

effective would tend to be characterized by relatively high expected gains from a minimal expenditure of time and effort on the part of consumers. More specifically, one might expect an informational approach to prove effective under the following conditions: (1) where the hazard is very easy to understand and incorporating the publicized information on risks makes very little demand on individuals' information processing capacities; (2) where the likelihood of an accident is sufficiently high and the consequences sufficiently severe that it is apparent to the consumer that major benefits are to be derived from taking account of the available information; and (3) in those circumstances where certain precautionary measures are required, where the time and effort necessary for the consumer to achieve a significant reduction in risk are also minimal. Even where an informational approach is successful it will be less than one hundred per cent effective, and therefore it may be less desirable than a ban or product standard. Where the latter alternatives are very costly to employ, however, and where there is reason to believe that consumers would be receptive to information on product risks, information dissemination becomes a highly attractive option.

The use of a product ban deserves consideration where there are very substantial information gaps of the type that cannot be filled by a consumer information or education program, and where the costs of this market failure are very high. A product ban has particular appeal where we are dealing with damages which are uncompensable - where it is impossible to restore the welfare of the victim after the accident has occurred. Figure 2 illustrates the type of balancing of costs and benefits that is involved. To simplify the discussion we will neglect the existence of possible physical and financial externalities. Then if area A in Figure 2 (the consumer loss) exceeds area B (the consumer surplus) production of the good in question can be said to result in a real resource loss; the value of the resources going into production of the good exceed the value placed on the output when

consumers' risk valuations under full information are considered. The case for a product ban is strengthened, where the size and elasticity of ("true") demand is such that elimination of the product involves a minimal sacrifice in consumer satisfaction. A product ban may result in the temporary unemployment or underutilization of some resources, but the resulting costs may not loom very large in relation to the cumulative long-term benefits that can be realized where hazardous goods are appropriately removed from the market.

A regulation requiring a modification in product design or an improvement in product performance may in some cases represent an adequate and, at the same time, much less restrictive response than a product ban to problems of involuntary risk. This need not represent the case, of course: in some cases it will be impossible to change the product so as to substantially reduce the element of risk; in many cases the significance of the required changes in design and price will be such as to result in a very substantial curtailment of consumer choice. The standard approach becomes less attractive where there is a range of complex factors contributing to the hazardous nature of the product. The unpredictable response of product users to the change in design can greatly complicate efforts to reduce product risks. Figure 3 represents a situation in which a very substantial reduction in risk is associated with a comparatively small increase in production costs. On the other hand, a reduction in risk may require a major modification in product design and have substantial implications not just for costs but for the product's general performance and appeal. The analysis in Figure 3 does not take into account the costs of developing, administering and enforcing regulations, but these can be highly significant particularly when relatively complex standards are involved.

An informational or educational approach and the establishment of standards need not be mutually exclusive

alternatives. The use of standards does not fully compensate for the lack of incentives in the market for the production of safety. Unless the creation of a standard in itself fills an educational role, there will still be a less than optimal production of safety by consumers. Producers will reduce risks as required by the regulation, but in a market of uninformed consumers they have no incentive for innovation which could reduce product risks below the prescribed level. There are also practical problems in some cases arising from the fact that a standard influences the quality of new products, but has no effect on the stock of existing products in use; an informational program can help to accelerate the rate at which such hazardous products are replaced. In some situations, therefore, where an informational approach is itself inadequate, efforts to inform and educate the consumer may provide a useful supplement to other forms of market intervention.

F) Other Considerations in Assessing Product Regulations

(1) Costs

In calculating the costs of regulation, account must be taken of any and all resulting sacrifices in resources or well-being. These include the previously noted costs associated with industry compliance, with administration and enforcement, and with the restrictions on consumer choice. Costs also include any long-term and more indirect inefficiencies and losses. The uncertainty generated by the often lengthy process of developing and refining standards can discourage investment and inhibit innovation. The nature of the solution developed to deal with a particular risk can have adverse health consequences in other respects and can negatively affect the achievement of environmental and other broad social objectives. A regulation can reinforce the advantage of specific firms and thereby have a very significant impact on industry structure; as a result the effect of the regulation on prices and the efficiency of resource

allocation could be significantly greater than one might expect from an examination of compliance costs. The effect of regulation on competition and prices is a particularly important consideration in many Canadian markets where imports account for a substantial proportion of sales. A standard that is more restrictive than that established by Canada's trading partners can constitute a major import barrier and entail efficiency losses similar to what would result from a quota or a very high level of tariffs. As well, Canadian exporting firms, who may be compelled to differentiate their output destined for Canadian and foreign markets, could experience significant cost increases as a result of attempts to implement a "unique" Canadian standard.

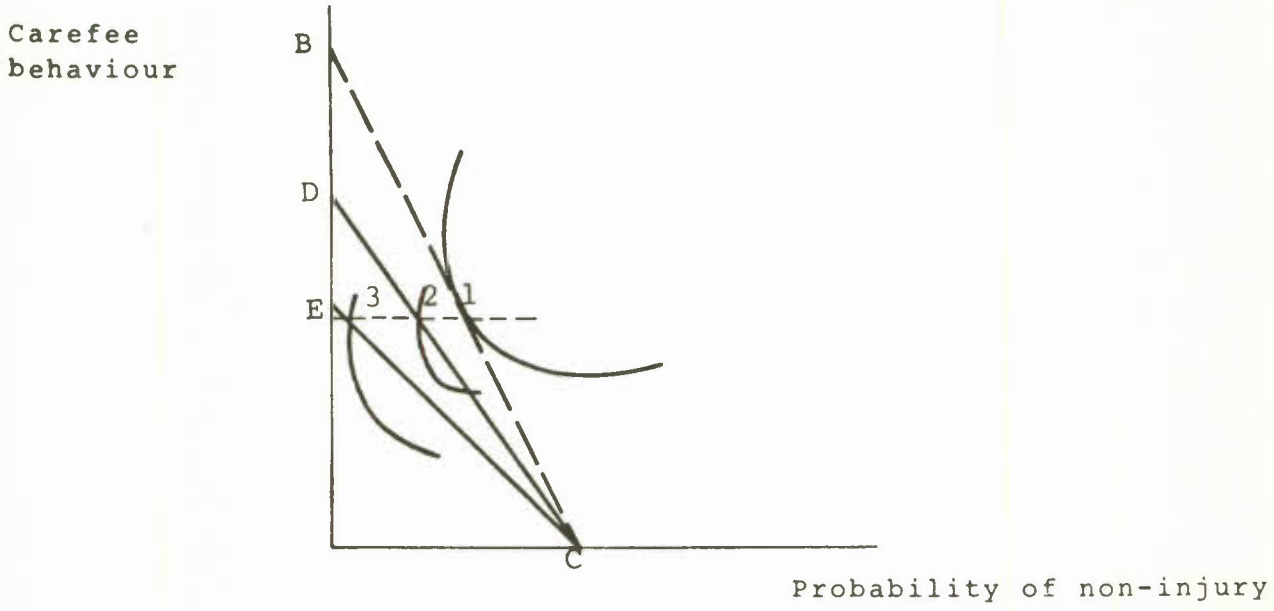
(2) Benefits and the Problem of Consumer Risk-taking

The benefit side of the equation is subject to an even more complex and less clearly understood range of influences. To estimate the benefits of a regulation there is a need for information on product hazards as well as on consumer preferences and attitudes to risk. One of the most difficult problems in the estimation of benefits is the determination of how individuals are likely to respond to a change in product design or performance. Aside from the question of whether a regulation is desirable, there is thus a more basic question as to whether in the "real world" it is likely to have the intended effect in reducing accidents.[25]

There are a number of things that can go wrong when a standard which appears effective on the basis of laboratory evidence is put into effect. The most serious challenge to the usefulness of standards in this respect has come from Peltzman.[26] The essence of Peltzman's argument is that safety regulation alters the trade-off between risk and what we will term "carefree behaviour", lowering the costs of the latter. The result is that the positive effects of regulation in reducing risk will be at least partially offset by the resulting

inclination of consumers to take greater risks. An important assumption made by Peltzman is that consumers correctly perceive the initial level of risk as well as the change in risk that results from regulation. However, this is contrary to the situation in most product markets where the lack of information on product risk was the main basis for regulation in the first place. The more typical situation is likely the one depicted in figure 4. Here the consumer underestimates the risks associated with the product and perceives the relationship between carefree behaviour and the probability on non-injury to be given by the dashed line, CB. Based on his preferences and his perception of

FIGURE 4



the tradeoffs the consumer's optimum position is point 1. The actual relationship between carefree behaviour and probability of non-injury is given by CE; and in behaving in such a manner as to achieve his optimum position (point 1), the consumer actually attains point 3 on the true tradeoff curve. A regulation which reduces the degree of product risk lowers the cost of carefree behaviour and moves the actual tradeoff curve from CE to CD. If the consumer's perception of the risks involved has not changed, he will still attempt to achieve point 1 on his perceived opportunity curve CB. In the post-regulation period this will bring him to point 2 on the new tradeoff curve CD. In this example the regulation has not contributed to an increase in

risk-taking; the consumer's behaviour has not changed, but because the cost of carefree behaviour has been reduced, the consumer is closer to an optimum position after the regulation (at point 2) than he was prior to the regulation (at point 3).

It is, of course, not necessarily the case that consumers' perceptions about the degree of product risk will be unaffected by regulation. One possibility is that consumers will continue to underestimate the risks associated with carefree behaviour, but that they will correctly perceive that regulation lowers the relative cost of carefree behaviour. In figure 4, this would be represented by a change in the slope of the the perceived curve such that the new curve CB' meets the vertical axis somewhere above point B. This particular set of circumstances would produce the increase in carefree or risky behaviour expected by Peltzman. Another possibility is that regulation and perhaps the associated information program, make consumers aware that they have substantially underestimated product risks. This would amount to an inward rotation of the perceived tradeoff curve so that it comes closer to expressing the actual relationship between carefree behaviour and the probability of non-injury. In this case the degree of carefree behaviour would decline, and contrary to the results expected by Peltzman, the influence of regulation on consumer behaviour would reinforce efforts to reduce accidents.

This discussion is not intended to minimize the problems involved in determining how consumers will respond to changes in technology and product design. There are numerous factors that can undermine the effectiveness of a regulation, particularly where success requires the cooperation of the consumers or users of the product. However, there is no a priori reason to expect that increased risk-taking on the part of consumers will necessarily erode efforts to enhance product safety.

(3) Distributive Considerations

A product regulation may have very different impacts on particular groups of consumers and producers, and these distributive consequences can significantly influence the overall assessment of a program's desirability. In general, the establishment of a standard involves asking all consumers to pay a fixed premium for a degree of protection against product related accidents. Consumers who are especially accident-prone thereby pay less than they would if premiums were established according to actuarial calculations. Those individuals who are highly risk averse, should also gain in the sense of being required to pay less than they are willing to pay for a reduction in risk. Alternatively, individuals who are highly efficient at producing safety through their own efforts may value the increase in protection arising from the standard less than the required premium. Consumers who place a high value on product features which are removed to comply with regulatory requirements would also be disadvantaged in having to pay a significant additional premium to acquire the given level of protection.

Peter Linneman has illustrated the significant potential distributive impacts of a product standard in his case study of the 1973 U.S. mattress flammability standard.[27] Linneman's study suggested that relatively careless consumers - those who were classified as smoking, drinking or smoking and drinking at the time of the burn - benefited considerably more from the regulation than did relatively careful consumers. At the same time, the standard provided a short-term advantage to large producers who had adopted the requisite production technology prior to the introduction of the regulation. Based on total industry sales and net income, the position of the largest firms in the industry improved significantly relative to that of the small firms in the period immediately after the regulation was introduced. Linneman explains that the temporary shortage of above-standard mattresses allowed the larger producers to realize

some short-term quasi-rents. These supra-normal profits would dissipate over time unless the standard constituted an effective long-run barrier to entry.

G) Other General Approaches to Product Safety

(1) Liability

It was noted previously that government regulation constitutes one component of a system which is directed at the achievement of a number of interrelated safety objectives. Liability law is another important element within this system. The main function of liability law is to protect the legitimately-held property rights of individuals and to delineate the claims that flow from these rights. In fulfilling this function, the liability system is primarily giving expression to society's expectations for fairness and distributive justice. However, in the process of meeting this goal, liability law contributes to a number of related objectives; it helps provide compensation to accident victims and it provides an incentive to firms to produce less risky products. Our focus is on the role of liability in the latter context; specifically the question we are addressing is whether and to what extent liability law can contribute to the efficient production of safety.

A system in which producers are held liable for damages attributable to their products has some appealing aspects. It requires producers to consider the consequences of their decisions for product safety, when due to a lack of information market incentives in this area are weak or non-existent. It calls on the knowledge producers are well equipped to provide about the means and costs of producing safety. The efficient production of safety does not depend - as in case of product regulation - on the knowledge and information of a central group of regulators nor on the effectiveness of government enforcement activities. And a liability system can be dynamic, adapting over

time to take account of new production norms and new opportunities for increasing product safety.

The extent to which the liability system supports efficiency objectives in the safety area will depend in part on the nature of liability rules in operation. There is an extensive literature on this topic, much of it flowing from the test established by Judge Learned Hand for liability in a negligence action: "if the probability be called P; the injury L; and the burden B; liability depends upon whether B is less than L multiplied by P; i.e., whether B<PL."[28] More recent literature has emphasized the need to focus on degrees of prevention, rather than total prevention; the incentive, that is, should be for the production of safety up to the point where marginal costs equate to marginal benefits. Attention has also been given to the need to tailor liability to respond to the fact that through careful behaviour consumers can produce a certain degree of safety more efficiently than producers. This has led to an emphasis on rules which provide for the party which is negligent, whether it be consumers or producers, to assume at least some portion of liability.[29]

The liability rule is only one element determining the nature of the incentives within the system for the production of safety. To provide an incentive to producers to provide the optimal degree of safety, the expected liability of a firm should approximate the total expected damage from the firm's activities. For the legal system to provide this type of incentive structure, a number of requirements must be met: cases in which producers are potentially negligent must be brought to court; the courts must be able to acquire the information that will enable them to determine negligence and appropriately apportion liability; the

courts must also be able to determine the value of losses (including pain and suffering) incurred due to the negligence of producers and provide damage awards accordingly.

Based on these general requirements the Canadian liability system has a number of notable shortcomings. Most product accidents involve relatively small losses and they are in fact not brought to court. Indeed even where very substantial losses are incurred, the extent of the expected gains from legal action often does not offset the full costs to the consumer of going to court. As Shapiro points out, an important element of these costs may be psychic in nature.[30] A recent survey of consumer product dissatisfaction sponsored by Consumer and Corporate Affairs Canada illustrates the problem.[31] The survey of over 3000 Canadians recorded 2400 incidents of product dissatisfaction and 132 incidents involving physical injury; in only 4 of 132 incidents - or 3% - did the individual seek legal advice or take legal action. A British study of home accidents produced similar results; in the 1234 accidents examined, only one accident victim commenced legal action.[32] When the costs of employing the legal system are prohibitive the operative liability rule is essentially one of strict consumer liability.[33]

A system of optimal incentives is also dependent on the ability of courts to correctly process the relevent information. Information requirements are much greater in a system where negligence has to be determined by the courts and apportioned among each of the parties. Halpern and Carr have noted that, because of the information demands of a system of comparative negligence, this theoretically attractive system may in fact give rise to highly imperfect decisions and to a system of incentives which is less desirable than that which would emerge from application of a strict liability standard.[34] This highlights the general fact that "in a world of imperfect information, no liability rule yields the socially optimal

solution".[35] In Canada, manufacturers are theoretically liable under tort law for damages and injuries owing to their negligence. In practice the operational standard has come to approximate strict liability, which requires the plaintiff only to establish that, (i) the product caused the injury, and (ii) the product was defective. The Ontario Law Reform Commission noted, for example, that "where the injured plaintiff proves defect and causation - and it should be noted that these are also requirements of recovery in the strict liability jurisdictions in the United States - he is very likely to succeed."[36] Under contract law the principle of strict liability applies to breach of warranties.

The Canadian system of liability law can therefore be seen as foregoing some of the theoretical benefits of a system of comparative negligence for the savings in information and transactions costs that are available through use of a less demanding standard. However, the information requirements of Canadian liability law are formidable nonetheless. Most product related injuries only involve the user and it is extremely diffcult to determine on the basis of his testimony whether the accident is due to a product defect or to the user's own negligence. A defect may result from an accident in the production process or it may be due to a deficiency in product design. The latter, which is more serious since it affects the entire product line, is generally very difficult to identify. The court is put in the position of having to assess technical decisions generally without the assistance of clear standards of design defectiveness. Problems are likely to be more complex where health hazards are involved, and where the causal link between illness and exposure is generally exceedingly difficult to establish. There are also significant complexities involved in assessing damages and providing appropriate awards on the basis of the value of both the pecuniary and non-pecuniary losses suffered by accident victims.

Even if the product liability system had very low transaction and information costs, there would still be some requirement for the direct regulation of product hazards. For many types of accidents the compensation available through the liability system must necessarily be highly imperfect. Where a product provides little consumer satisfaction but gives rise to very substantial losses because of the extreme nature of the hidden hazards, a product ban represents the most efficient and most effective response. Government regulation also provides a means of dealing with hazards which are likely to fall outside the general bounds of what is considered a product defect. Let us look, for example, at the relevance of liability law to recent concerns over exploding pop bottles. In the case of Cohen v. Coca-Cola Limited the Supreme Court of Canada indicated that "the bottler of carbonated beverages owes a duty to furnish containers of sufficient strength to withstand normal distribution and consumer handling."[37] On this basis the plaintiff, who was injured by a fragment of glass from a bottle of carbonated beverage which exploded spontaneously in his hand, won his appeal against a judgment of the Quebec Superior Court. The decision of the Supreme Court suggests the outcome in this case would have been quite different if the plaintiff had mishandled the bottle in some way. While the courts may impose a duty on the producer "to design the product so as to make it safe in cases of common misuse",[38] it is highly unlikely that the producer would be found liable in a situation where the accident victim had precipitated the explosion by dropping the soft drink bottle. Nonetheless it could be maintained that because of the forceful reaction that takes place when a bottle is dropped and the considerable distance that some of the glass particles are propelled, there is an element of hidden risk involved. It is conceivable that the costs of such accidents do not justify the costs of providing a remedy. But a system of product liability does not provide the manufacturer of soft drink bottles with the incentive to weigh such considerations and to provide a safer product in these circumstances if it is indeed economic.

The role played by the highly imperfect Canadian system of product liability in promoting the efficient production of safety is a useful but nonetheless limited one. Under the current system firms have a strong incentive to balance the costs of prevention against the costs of compensation for defects which are likely to give rise to severe personal injury and substantial property damage; in relation to those accidents which are very likely to result in legal action, the liability system does provide incentives for the production of safety, although the resulting incentive structure is certainly not an optimal one. While regulatory bodies also have an important role in dealing with major risks of this nature, the liability system provides an important first line of defence; it keeps many poor and clearly defective products from ever coming on the market. Regulation and product liability are also complementary in another sense. Where regulatory enforcement activities are inadequate, the threat of a liability suit can provide the required additional incentive for compliance with government regulation. Similarly, in weighing the expected costs of liability action, firms may include in their calculations the potential for repeated liability suits to give rise to regulatory intervention. The existence of a product safety regulation may support the operations of the liability system more directly by providing prima facie evidence of negligence. Saskatchewan made it explicit in its 1977 Consumer Product Warranties Act that the breach of a safety standard is to be prima facie evidence that a defect exists.[39]

There have been various suggestions for improving the Canadian product liability system. Some of the proposals designed to make the system more accessable to consumers, and to eliminate the deficiencies and anamolies in current laws governing product liability, would contribute to the effectiveness of liability as a deterrent to the production of unsafe products.[40] At the same time, it is necessary to appreciate the fact that the liability system functions primarily to define

and protect individuals legal rights and privileges. There are undoubtedly limits to how far a system of distributive justice can be extended to advance the objectives of economic efficiency before its usefulness in its primary role is seriously undermined. Steiner has forcefully argued that the role of the courts in cases of "interaction damage" is to protect "legitimate expections" based on the ownership of property rights, and "to ignore legitimate expectations for 'desirable' results is to subvert the very essence of the rule of law".[41] There may well be ways to enhance the effectiveness of the liability system in an economic sense which are not incompatible with the dictates of the rule of law. However, the significant deficiencies in the nature of the economic incentives established by the current system of liability law and the major constraints imposed by non-economic objectives on changes to the system suggest that the role of liability law in promoting the efficient production of safety must necessarily be limited and largely supplementary to the role of government regulation.

(2) Self-Regulation

The issue of self-regulation is the subject of a separate Council study and, hence, the brevity of this discussion.[42] In the safety area industry efforts at self-regulation can reduce the resources government regulators need to devote to the development and enforcement of safety standards. Given the scarcity of such resources this can provide an important attraction. On the other side are concerns about the nature of the standards that result from self-regulation and about the limited ability of industry associations to effectively enforce these standards.

There are a number of reasons why producers may attempt as a group to develop safety standards. A standard can improve the image and appeal of the industry's product and thereby lead to an increase in consumer demand. A generally accepted set of require-

ments can help clarify the manufacturer's responsibility in terms of eliminating product risks, and reduce the threat of successful legal action. Alternatively standards may be voluntarily developed to prevent the introduction of more stringent and more costly compulsory standards by government. As Hunt has indicated, where deterrence is the primary objective and where the industry association perceives a high standard of safety as necessary to deter government intervention, it's conceivable that voluntary effects could lead to a standard as stringent as that which would result from government regulation.[43] There may be other motivations, however, which could lead to results less consistent with general public policy objectives. Standards might be sought because they enhance economies of scale or increase investment requirements and thereby make new entry into an industry more difficult. Or firms may be attracted to voluntary standards because of the increased possibilities that could arise for collusion and policy co-ordination.

Self-regulation cannot effectively deal with product risks that are due to imports, and so where imports account for a significant share of the market and the hazards associated with imports constitute a significant source of concern voluntary standards are likely to be inappropriate. They are also likely to be inadequate in highly competitive industries where there is an opportunity for individual firms to achieve competitive gains by departing from the voluntary arrangements. While there may be very substantial prospective benefits - in terms, say, of an improved industry image - from general adherence to a voluntary standard, individual producers will have a strong incentive in these circumstances to pursue an independent course and attempt to "free ride" on the compliance of other firms in the industry. In highly concentrated industries, compliance tends to be easier to achieve but there is also a significant danger that self-regulation will facilitate collusion among firms in the industry.

Concerns about the nature and effectiveness of industry self-regulation are somewhat reduced where standards are developed in conjunction with an accredited standard-writing institution. Where a process of certification is involved and where the certificating body has a wide degree of recognition, the incentives for individual producers to comply with voluntary standards are considerably strengthened. Indeed in some cases the pressure on firms in the industry to obtain certification are such that the certification process is a de facto form of regulation. There may also be less reason to be concerned about the adequacy of the prescribed standard given the opportunity provided by the major standards bodies for input by consumers and outside experts. Of course there is no assurance that the result will be be optimal based on cost-benefit calculations, but neither is this the case with government regulation. What is lacking in the case of voluntary standards is the public accountability of those who are responsible for formulating the regulation. It's important to recognize that certification is often closer to a regulatory program than to an information program, and that in this situation what is essentially policy-making becomes the responsibility of non-elected officials.

Voluntary regulation, which is not restrictive of competition, can help the consumer deal with some of the important information deficiences in the market. While the pass-fail type of ratings generally provided by standards organizations is not the most useful information from the consumer's perspective it can nonetheless help fill some critical information gaps. There is a need to be more wary of the restrictive effects on competition and on consumer choice where the certification process becomes an effective form of regulation; but this form of regulation by industry itself can in some circumstances support general public policy objectives and make a useful contribution, responding to risks which the regulatory agency has not had the opportunity or the resources to

adequately address. Self-regulation, however, is clearly not a substitute for government regulation. Where there are significant gains to be realized from eliminating or reducing product hazards, then the appropriate regulations should be made mandatory and applied to all producers. In this regard the blunt conclusion of the U.S. National Commission on Product Safety bears repeating: "As related to product safety, self-regulation by trade associations and standards groups drawing upon the resources of professional associations and independent testing laboratories, is legally unenforceable and patently inadequate."44

PART II

PRODUCT SAFETY REGULATION UNDER THE HAZARDOUS PRODUCTS ACT

A) THE ACT AND THE AGENCY

(1) Background to the Act's Passage

The Hazardous Products Act was initially introduced in the spring of 1968 as a bill designed to deal exclusively with the problem of hazardous substances. It was reintroduced in 1969 as a much broader bill directed at hazardous products generally, and given Royal Assent on June 27th of that year. The Hazardous Products Act was one of the first legislative initiatives of the new Department of Consumer and Corporate Affairs which had been created in 1967 with a view to developing a co-ordinated approach to consumer-related issues and providing consumers with a stronger voice in government. The period when the Act was introduced was marked by a heightened awareness of the problems confronted by consumers in the market-place. A number of developments in the 60's focussed public attention on consumer issues and provided a major boost to the growth and influence of the consumer movement. In the U.S., public attention was captured by Ralph Nader's revelations concerning auto safety, by the Thalidomide drug scandal, and by a number of powerful social commentaries such as Packard's, The Hidden Persuaders and Carson's The Silent Spring. In Canada, consumer concerns were highlighted through the spontaneous supermarket boycotts of the mid-60's, and the cross-country hearings of the joint House-Senate Committee on consumer credit.[45]

These developments helped to provide a highly favourable climate to address some of the gaps in Canada's product safety legislation. While there were a number of federal statutes on the books at this time that dealt with safety issues, the

coverage of consumer products was extremely limited. One of the most important pieces of legislation in this area is the Food and Drugs Act which is concerned with the safety and reliability of drugs, foods, cosmetics and medical devices. Other legislation which touches on the issue of consumer product safety include: the Pest Control Products Act, which relates to the safety of, for example, disinfectants, pesticides and preservatives; and the Explosives Act which extends to the safety of consumer products such as fire crackers and caps used in toy guns. In addition, over the late 60's legislation was being planned to address safety problems related to the design and construction of motor vehicles and original vehicle equipment (the Motor Vehicle Safety Act was passed in 1970), and to provide safety standards for radiation emitting devices such as television sets and microwave ovens (the Radiation Emitting Devices Act was also passed in 1970). The limited scope of the body of existing legislation became particularly clear over the 60's as a number of hazardous chemical products, which were outside the reach of the legislation administered by the Department of Health and Welfare, appeared on the market.

The provinces also have jurisdiction in the consumer safety area. Section 91 of the B.N.A. Act provides the federal government with powers over criminal matters and over interprovincial and international trade and commerce thereby justifying federal initiatives in the safety area.[46] At the same time the jurisdiction granted the provinces in Section 92 over property and civil rights and local matters has allowed the provinces considerable freedom to legislate with respect to the terms and conditions under which goods and services are sold within their territory. Local health authorities have long been granted powers to intervene in the sale of articles which are a threat to public health. The provinces actively regulate electrical products - attempting to ensure that all electrical equipment and installations comply with the requirements of the

Canadian Electrical Code - and they have enacted legislation covering other select products, such as stuffed goods. The limited jurisdiction of the provinces, however, makes enforcement of provincial legislation extremely difficult. While provincial law can extend to all sales in a province, regardless of where a product is manufactured, effective enforcement at the sales level involves the formidable task of regularly inspecting a vast number of retail outlets.

The inadequacy of the framework of federal and provincial product safety laws in existence in the 60's was illustrated by the appearance on the Canadian market of necklaces made from poisonous jequirity beans and ice balls containing contaminated water. In 1967, in an appearance before the Senate Committee on Banking and Commerce, the Deputy Minister of National Health and Welfare was asked how his department had dealt with these emergencies. Dr. Crawford replied as follows:

> Well, we had to deal with the provincial departments on this. We telephoned and telegraphed and told them of the hazard which was in their shops and they dealt with it provincially. This is how we had to handle that situation. Of course it was a pretty time-consuming process.[47]

At the time the Canadian Act was passed the U.S. government was awaiting the report of the National Commission it had established in 1967 to undertake a comprehensive examination of the consumer product safety issue. However, some important legislation had already been passed in the U.S. As early as 1953 a Flammable Fabrics Act was introduced to respond to the changes posed by highly flammable sweaters and cowboy play-suits of brushed rayon. A Hazardous Substances Act was introduced in the U.S. in 1960 and amended in 1966; this legislation addressed many of the kinds of concerns Canadians had in the area by imposing cautionary labelling requirements and banning certain particularly hazardous household substances. In Britain, the

government had been given very broad authority to regulate product safety through the Consumer Protection Act of 1961. This legislation provided for the imposition of standards or packaging and labelling requirements on any class of goods; by the late 60's standards had been developed in the U.K. for a number of products including cribs, portable oil heaters, children's clothing and toys.

(2) The Hazardous Products Act

The Hazardous Products Act[48] provides the government with extensive powers to regulate the sale of hazardous or potentially hazardous consumer goods in Canada. A hazardous product is defined as "any product or substance included in Part I or Part II of the Schedule" to the Act. The Governor in Council may insert in the Schedule any consumer good that "he is satisfied is or is likely to be a danger to the health or safety of the public." Products in Part I of the Schedule cannot be advertised or imported into Canada. Products in Part II can only be advertised, sold or imported under the specific circumstances or conditions authorized by the regulations.

While the Act is primarily concerned with consumer products, its coverage extends beyond the bounds of what is generally considered consumer or household goods.[49] According to Section 8 the legislation pertains to: "any product designed for household, garden or personal use, for use in sports or recreational activities, as life-saving equipment or as a toy, plaything or equipment for use by children"; and "any product or substance that is or contains a poisonous, toxic, inflammable, explosive or corrosive product or substance or other product or substance of a similar nature." Products that come under the Explosives Act, the Food and Drug Act, the Pest Control Products Act, and the Atomic Energy Control Act are specifically excluded from the purview of the Hazardous Products Act. It is significant

that the Act refers to the advertising, sale, and importation of identified hazardous products; it does not prohibit the manufacture of such products. A prohibited product could legally be produced in Canada and exported for distribution in a country where it is not on the banned list. The legislation would also not be applicable to the production and sale of consumer services though this may involve the use of items defined as hazardous under the Act. And since the reference is specifically to sales, the Act would not appear to be applicable to goods supplied without payment, as for example in the case of free gifts and prizes offered by commercial firms.

When the legislation was initially under consideration in Parliament much of the discussion focussed on the discretionary power the Bill afforded the Minister of Consumer and Corporate Affairs.[50] In order to balance the need for decisive action against concerns about the exercise of unchecked authority the Act provides three protective devices. First, every amendment adding a product to the Schedule must be tabled in Parliament within 15 days; if the amendment does not receive Parliamentary approval it becomes ineffective. Second, the Act provides for the establishment of a Board of Review to assess the basis for a regulatory action where a formal request is made by a manufacturer or distributor. Two such Boards have been established.[51] And third, the Act allows the owner of goods seized in the course of an inspection to apply to a Magistrate for the restoration of his possessions.

Notwithstanding the checks in the legislation the Act provides the government with very broad authority to regulate hazardous products. Section 8 permits the Governor in Council to introduce a regulation when he is satisfied that a product "is or is likely to be a danger to the health or safety of the public." The legislation does not put an onus on the government to establish that the regulation is desirable on the basis of

benefit-cost calculations and/or other considerations; there is no need to establish that the hazard is "unreasonable"; the government is not even required to show that the danger to health or safety is a significant one. Since August 1978, however, the federal government has required that socio-economic analyses be prepared for all major proposed social regulations, which includes those in the product safety area. While there are basic controls within the Parliamentary system of government on the way in which such regulatory authority is exercised, controls which may differ significantly from those available in other countries, the notable contrast between Canadian and U.S. legislation is of interest. Legislation in the U.S. is directed specifically at "unreasonable" risks. Court decisions, such as in the Aqua-Slide case referred to previously, have made it clear that the law imposes an onus on the Consumer Product Safety Commission (CPSC) to demonstrate both the presence of an unreasonable risk of injury and the likelihood that a proposed regulation would significantly reduce the risk. The authority of U.S. regulators has been further circumscribed by the provisions in the Consumer Product Safety Act for public notice of proposed regulations, for rule-making proceedings which afford an opportunity for public comment, and for judicial review where this is desired by an individual adversely affected by a regulatory decision.[52]

While the authority provided by the Canadian Act is wide in scope, the provisions in the Act to assist in the achievement of its objectives are comparatively modest, and here again there are some notable contrasts with U.S. legislation. An offence under the Canadian Act is punishable on summary conviction by a fine of $1,000, imprisonment of up to six months or both; conviction as an indictable offence can lead to imprisonment of up to two years. The Canadian Act is criminal law and the relatively high standards of proof established for criminal cases must be met to gain a conviction under the Act. U.S. product safety legislation by contrast provides for both civil and criminal

penalties. Violations of U.S. law can result in civil penalties of up to a total of $500,000 and criminal penalties of up to a year in jail and a fine of $50,000. Further, the Canadian Act does not compel manufacturers to notify Consumer and Corporate Affairs when they are aware that a product contains a defect which could create a substantial risk of injury. It requires manufacturers to respond to a specific request from the Minister for information on their product, but it does not require manufacturers to maintain records on test results and other matters, which can assist in determining whether or not they are in compliance. The U.S. Act requires notification where the manufacturer is aware of a substantial risk (whether or not a standard has been promulgated) and it empowers the CPSC to require that relevant technical data be maintained by manufacturers and made available to the Commission. Also U.S. legislation allows the CPSC to take action in the absence of a standard where a sufficiently serious hazard is identified. There is no similar provision in Canadian law. Nor do Canadian regulators have access to the range of remedial actions short of prosecution available to their U.S. counterparts. The latter can require manufacturers or distributors: to notify the public about the existence of a defect, to repair or replace a defective product, or to refund the purchase price of a product. The mechanisms within the U.S. system would not necessarily be appropriate or desirable in Canada and the distinctions between Canadian and U.S. law do not in themselves suggest that the provisions relating to the enforcement of the Canadian Act are inadequate. An examination of these provisions, however, does somewhat modify the perspective that emerges from an examination of the scope and coverage of the Hazardous Product Act.

(3) The Product Safety Division

The Hazardous Products Act is administered by the Product Safety Division of Consumer and Corporate Affairs Canada (CCA). Some ninety people are involved in developing, administering and

enforcing the regulations under the Act. Salary and operating expenditures associated with functions at headquarters, in the laboratory, and in the field amount to approximately $2.5 million and represent just under 10% of the total spending of the department on consumer programs. Table 1 shows the expenditures and personnel devoted to the product safety function over the years 1972/73 to 1979/80. Excluded from the table are expenditures in connection with the department's information activities in the area of product safety which were in the range of $50,000 to $175,000 over the period.

The headquarters staff of the Product Safety Division is divided functionally into two groups. The development group is responsible for identifying hazards, undertaking the necessary research, consulting with industry and other concerned interests, and developing the required regulations. The enforcement side of the headquarter's operation is responsible for keeping industry informed about product safety regulations, co-ordinating and directing the operations of field inspectors, and seeing that appropriate follow-up action is taken in the case of suspected violations. The product safety laboratory assists headquarter's staff in the development of standards, and undertakes the testing required to determine if products are in compliance with existing regulations. The test results obtained by the laboratory can constitute important evidence in court cases against suspected offenders. Almost half the total number of employees of the department working in the product safety area are involved in field inspection and enforcement activities. These employees are functionally responsible to the Director of the Product Safety Division but they report to the Director of field operations for the Consumer Branch in each of the main regions. One advantage of this organizational structure is that it makes it possible for the Product Safety Division to draw on other resources of the Consumer Branch that are available in the field when there are particularly serious problems to be dealt with

As Table 1 indicates there has been little growth in the size of the product safety staff since the initial years of the program's development. The headquarters staff, which is responsible for the research and analysis supporting the Branch's activities, has remained at virtually the same size over the past seven years. Much of the apparent growth in the field inspection staff reflects a classification change, with inspectors who were involved in enforcing the Act becoming formally attached to the Product Safety Branch in 1977/78. The slight growth that has occurred in the inspection force has certainly not kept pace with the increase in the number of establishments which are potential producers or importers of hazardous products. The operating expenditures of the headquarter's staff (excluding salaries), which are influenced to a significant degree by the use made of the services of independent testing agencies, reached a peak in 1977/78 and have declined since then.

Table 1

PRODUCT SAFETY BRANCH BUDGET 1972 - 1980

	Headquarters		Laboratory		Field		Total	
	Person Years	Budget	Person Years	Budget	Person Years	Budget	Person Years	Budget
1972/73	15	$208,300			12	$ 62,000		
1973/74	26	$439,100			14	$179,000		
1974/75	25	$455,000			14	$228,000		
1975/76	24	$481,300			19	$332,000		
1976/77	24	$566,688			19	$392,000		
1977/78	24	$723,000	22	$420,532	39	$923,000	85	$2,066,532
1978/79	24	$668,000	23	$582,200	39	$961,000	86	$2,211,200
1979/80	25	$800,200	22	$710,800	40	$958,000	87	$2,469,000

Note: (1) Budgetary totals include allocations for both salary and operating and maintenance expenditures.

(2) The laboratory did not become part of Product Safety Branch until 1977/78 though it was available for the use of the Branch prior to that date.

(3) Consumer fraud inspectors who had participated in product safety enforcement activities were formally included in the Product Safety field staff in 1977/78. This accounts for the sizeable increase in the field staff between 1976/77 and 1977/78.

The $2.5 million in spending on product safety activities in Canada compares with annual expenditures in the U.S. of over $40 million to support the activities of the CPSC. While it's difficult to gauge the relative magnitude of the product safety function in the two countries, one would not expect the basic task of analyzing accident data and developing regulations to be substantially less complex in a smaller country; in other words, the comparative resources devoted this sub-activity in Canada is likely to be greater than suggested by the proportionate difference in population or aggregate economic activity. It is significant, therefore, that the manpower devoted to the analysis of risks and development of product safety regulations in Canada is less than 5% of that in the U.S.

B) REGULATORY IMPACTS

(1) The Regulations

The purpose of this section is to look at some limited evidence on the effects of a number of product safety regulations in an attempt to determine in a general way whether and to what extent the Hazardous Products Act contributes to the efficient production of safety. The emphasis on regulations provides a slightly restricted view of the activities of the Product Safety Division. In connection with administering the Act, for example, the Division makes some effort to inform consumers about household safety in general as well as about new and emerging risks which are not the subject of regulation. And, at times as a complement or substitute to regulation the Division attempts to encourage industry to voluntarily upgrade its standards and increase the safety of its products. A recent example of the latter is the voluntary standards developed to deal with the flammability danger from polystyrene home insulation. The Product Safety Division insisted that the "voluntary" standards established in this case require: the application of a fire-retardant to the resin used as a basic production input,

labelling of the polystyrene boards to indicate the nature of the flammability hazard, and the provision of information at the point of sale on proper installation. The significant efforts of the department in helping to develop this standard and in monitoring the degree of industry compliance would not be reflected in a measure of regulatory output based on the items covered in the schedule to the Act. Nonetheless, the vast majority of the department's resources in the product safety area are clearly directed towards the establishment and enforcement of regulations coming under the Hazardous Products Act. While some aspects of the department's activities are not captured by an examination of regulations, the latter would certainly reflect the general nature and significance of the department's contribution to improved product safety.

Table 2 provides a list of items included under Part I and Part II of the Schedule to the Hazardous Products Act. When the Act was passed in Parliament the original Schedule contained what the Minister of Consumer and Corporate Affairs, Ron Basford, referred to as a "short and very basic" list of products. Under Part I the original schedule banned jequirity beans; furniture, toys and other items intended for children with a liquid coating material containing excessive lead; and paint and varnish remover which are highly flammable. Shortly thereafter, in March 1970, the Hazardous Substances Regulations were introduced, imposing labelling requirements on household bleaches, cleansers and polishes containing a number of potentially hazardous substances (the original regulation and later amendments govern items 1 to 11 in Part II of the Schedule). Another of the early initiatives of the department were the Toy Regulations originally issued in November 1970 (these govern items 12 to 19 in Part II). The restriction on the design and construction of toys in Part II and

Table 2

PRODUCTS AND SUBSTANCES INCLUDED IN PART I AND PART II OF THE SCHEDULE TO THE HAZARDOUS PRODUCTS ACT[1]

Part I - it is unlawful to advertise, sell or import into Canada:

1. Jequirity beans.

2. Children's Furniture - lead painted.

3. Liquid coating materials - flashpoint less than 0°F.

4. Flammable textiles (other than Part I, 5 & 13 Part II, 13, 28 & 29) with;
   a) flame spread 3.5 seconds or less - smooth surface;
   b) flame spread 4 seconds or less - raised surface.

5. Children's Sleepwear up to size 6x flame spread of 7 seconds or less.

6. Spectacle frames - made of/contain-cellulose nitrate

7. Children's toys etc. - made of/contain-cellulose nitrate other than Ping Pong Balls.

8. Children's toys etc. - containing;
   (a) carbon tetrachloride;
   (b) methyl alcohol - or more than 1% weight to volume;
   (c) petroleum distillates - or more than 10% weight to volume;
   (d) benzine;
   (e) turpentine - or more than 10% weight to volume;
   (f) boric acid or salts of boric acid;
   (g) ethyl ether.

9. Children's toys - protective or decorative coating - with;
   (a) lead pigments;
   (b) more than 0.5% weight to weight of lead in total solids;
   (c) any compound of antimony, arsenic, cadmium or barium;
   (d) any compound of mercury.

10. Children's toys etc., that;
    (a) make or emit noise exceeding 100 decibils;
    by a child of less than years of age;
    (e) contain plant seeds as stuffing material.

11. Kite strings that will conduct electricity.

12. Consumer Products that consist of or contain;
    (a) carbon tetrachloride; or
    (b) 1,1,2,2 - tetrachlorothane.

13. Bedlinens (including blankets) having a flame spread of;
    (a) 7 seconds or less - smooth surface;
    (b) 7 seconds or less - raised fibres.

14. Oral products for babies (teethers, soothers and pacifiers) containing a viable micro-organism.

14.1 Structural devices that position feeding bottles to enable babies to feed themselves therefrom while unattended.

15. Asbestos clothing, other than;
    (a) those designed for fire & heat protection;
    (b) those where the asbestos fibres will not become separated from the the textile fibres.

16. (1) Bathtub enclosures, shower doors & storm doors made of glass which is not safety glass.
    (2) Exterior doors for household use, other than storm doors that;
    (a) are made of glass that is not safety glass;
    (b) contain a pane of glass exceeding 5 sqaure feet in area that is not safety glass and the lowest edge of which is less than 3 feet from the bottom edge of the door.

17. Pencils & Artists' brushes - lead coated.

18. Hockey helmets that do not meet sections 3, 4 and 6 safety standards of "Hockey Helmets, No. Z262.1 - 1975"

19. A balloon inflating product that contains any aromatic, aliphatic or solvent vapour that may be released directly into the mouth.

20. Consumer products containing 5 ppm or more ethyl bromocetate.

21. Disposable metal containers that contain a pressurizing fluid composed of vinyl chloride that are designed to release pressurized contents by the use of a manually operated valve that forms an integral part of the container.

22. Automotive engine coolant antifreeze containing 5% w/w or more of aliphatic or aromatic hydrocarbons

23. Consumer products containing 5 ppm w/w or more nitrobenzine.

24. Liquids containing polychlorinated biphenyls for use in microscopy (including immersion oils but not including refractive index oils).

25. Kites - uninsulated metal that;
    (a) has a maximum linear dimension in excess of 150 150 mm (6 in.); or
    (b) is plated or coated with a conductive fibre which exceeds 150 mm (6 in.).

26. Products that are composed of or contain actinolite, amosite, anthophyllite, chrysotile, crocidolite, cummingtonite, tremolite or any other type of asbestos and that;
    (a) are for use by a child, if they are made in such a way that asbestos may become separated from the products; or
    (b) are for use in modelling or sculpture.

27. Candles that re-ignite spontaneously.

28. Clothing treated with or containing tris (2, 3 dibromopropyl) phosphate.

29. Any substance used to induce sneezing, whether 3,3'-dimethoxybenzidine (4,4'-diamino-3,3'-dimethoxybiphenyl) or any of its salts.

30. Cutting oils & cutting fluids for use in lubricating & cooling the cutting area in machine operations, that contain more than 50 micrograms per gram of any nitrite when monoethanolamine, diethanolamine or triethanolamine is also present.

31. Glass containers of a capacity of 1.5 litres containing a non-alcoholic carbonated beverage.

Table 2 (cont.)

PRODUCTS AND SUBSTANCES INCLUDED IN PART I AND PART II OF THE SCHEDULE TO THE HAZARDOUS PRODUCTS ACT

Part II - it is unlawful to advertise, sell or import into Canada except as authorized by the regulations:

1. A bleach or cleanser that;
   (a) contains chlorine; or
   (b) is a source of available chlorine packaged as a consumer product.

2. A product packaged as a consumer product that is;
   (a) a corrosive chemical;
   (b) a corrosive product that contains a corrosive chemical and has a pH of 2.5 or less or 11.5 or more;
      (i) before it is prepared for use,
      (ii) when it is prepared for use according to the directions on the label.

3. Petroleum distillates when packaged as consumer products.

4. Adhesives, cleaning solovents, thinning agents and dyes containing toluence or acetone when packaged as consumer products.

5. Polishes, cleaning agents, liquid coating materials, paint & varnish removers containing 1,1,2 - trichloroethane, 1,2 -dichloroethane, or chloroform.

6. Fire extinguishing fluids composed of or containing any halogenated aliphatic hydrocarbons.

7. Antifreeze preparations containing ethylene glycol or diethylene glycol, when such preparations are packaged as consumer products.

8. Turpentine or products containing turpentine when such products are packaged as consumer products.

9. Methyl alcohol or products containing methyl alcohol when packaged as consumer products.

10. Disposable metal containers of consumer products designed to release pressurized contents by the use of a manually operated valve that forms an integral part of the container

10.1 Alkyl cyanocrylate adhesives.

11. Products used in polishing, cleaning or plating metal that contains hydrocyanic acid or salts of, and are packaged as consumer products.

12. Toys, equipment and other products for use by a child that;
   (a) are packaged in flexible film bags;
   (b) are operated electrically;
   (c) are or are likely to be used by a child of less than 3 years of age and have a component that is separable;
   (d) have exposed metal edges;
   (e) have embedded in them a wire frame or structure;
   (f) are made, in whole or in part, of plastic that would, upon breaking, expose sharp edges;
   (g) have exposed wooden surfaces, edges or corners;
   (h) are made, in whole or in part, of glass;
   (i) have fasteners used in their construction;
   (j) have a folding mechanism, bracket or bracing;
   (k) contain, as an integral part, a spring-wound driving mechanism capable of injuring a child's finger, other than construction toys;
   (l) contain a projectile component, other than a rocketry component, capable of causing a puncture wound;
   (m) are designed & constructed so that they
      (i) are large enough for a child to enter or be placed therein; and
      (ii) can be closed by a lid or door;
   (n) are stationary & intended to bear the weight of a child;
   (o) contain a surface, part or substance that during reasonably foreseeable use, will or may become heated;
   (p) contain a toxic substance other than a toxic substance named in item 8 of Par 1 of the schedule to the Act;
   (q) contain a corrosive substance, irritant or sensitizer; or
   (r) are or are likely to be used by a child of less than 3 years of age and are made of or contain any plastic material.

13. Dolls, plush toys and soft toys that have;
   (a) a fastening in them to attach parts, clothing or ornamentation;
   (b) any stuffing in them;
   (c) eyes or a nose the greatest dimension of which is 1¼ inches or less;
   (d) an outer covering consisting in whole or in part of a flat or raised fibre textile material or natural furs
   (e) exposed surfaces consisting in whole or in part of yarn described in paragraph (e); or
   (g) a squeaker, reed, valve or similar device.

14. Pull & push toys that have shaft-like handles 3/8 of an inch (10mm) in diameter or less.

15. Toy steam engines.

16. Finger paints.

17. Rattles.

18. Elastic intended for attaching toys, equipment or other products for use by a child across a baby carriage, crib or playpen.

19. Batteries for use in or with any toy, equipment or other product for use by a child.

20. Products that are;
   (a) for use or that may be used in storing, preparing or serving any food as defined with Food & Drugs Act; and
   (b) made in whole or in part of ceramics having a glaze that contains lead or cadium.

21. (1) Science education kits that contain any chemical for use in a chemical or pyrotechnic reaction or to preserve a biological specimen;
   (2) Chemicals packaged for restocking science education kits described in sub item (1).

22. Matches.

23. Safety car seats for children other than seatbelt assemblies that are sold, imported or advertised with motor vehicles as components thereof and replacements for such items.

24. Charcoal for use in domestic heating.

25. Cradles, cribs & crib extension rails.

25.1 Playpens (play yards) for children.

26. Pacifiers & similar products for babies except as described in item 14, Part 1.

27. Kettles for household use that release lead into water boiled therein.

28. Carpets, carpeting etc., (except one of a kind, or Oriental rugs) made of textile fibres, that have not been treated with fire retardant and when tested in accordance with the Canadian Standard Textile Test Methods, the sample has a rate of flammability failure in excess of the rate permitted.

29. Carpets, carpeting etc. (except one of a kind, or Oriental rugs) made of textile fibres, that have been treated with a fire retardant and, when tested in accordance with the Canadian Standard Textile Test Methods, the sample has a rate of flammability failure in excess of the rate permitted.

30. Paints, enamels and other liquid coating materials;
   (a) for interior or exterior use,
   (b) that contain more than 0.5% w/w of lead.

Items 31 and 32 not yet assigned.

33. Pine oils including;
   (a) synethetic pine oils;
   (b) pinewood extracts containing alpha terpine or other terpine alcohols or a mixture of these substances with ethers & hydrocarbons; and
   (c) products containing pine oils.

34. Audible signal appliances, control units, smoke & heat detectors for use in household fire alarms and smoke alarms that do not meet applicable standards.

35. Lighters intended for use with cigarettes, cigars & pipes.

36. Wood based cellulose fibre for use as loose fill thermal insulation in indoor use.

[1] Items included in the schedule and amendments announced as of March 1, 1980.

prohibitions issued (mostly) at the same time under Part I (items 7 to 11) were aimed at reducing the risks related to poisoning asphyxiation, cuts, burns, electrical shocks and other accidents. Regulations setting minimum standards for the flammability of textile products (Part I, item 4) and children's sleepwear (Part I, item 5) were issued in November 1971. The basic regulatory structure which had been developed in the 2½ years following the passage of the Hazardous Products Act was later modified through regulatory amendments, and supplemented through additions to the Schedule of hazardous products. Among the more important additions in later years were: the child's car seat regulations (Part II, item 23), issued April 1972; the crib regulations (Part II, item 25), first issued October 1973; the safety glass regulations (Part I, item 16) originally issued July 1973; the carpet flammability regulations (Part II, items 28 and 29) introduced May 1975; and the 1.5 litre soft drink bottle regulations (Part I) issued August 1979.

The items included in the Schedule would seem, with a few exceptions, to fit comfortably under the label of hidden or involuntary risks. There are clearly basic problems of consumer knowledge and awareness relating to the risks associated with hazardous substances, flammable products, cribs and rattles, and spontaneously exploding pop bottles. While some of the specified toy hazards are not hidden to the same extent, the unique vulnerability of young children and the limitation that comes from the fact that purchasers of child products are not directly involved in their use, would seem to create information problems of a similar magnitude. The concept of hidden hazard applies less easily to products such as glass doors and matches, where one would expect the element of risk to be apparent to most users. Two of the items on the Schedule, hockey helmets and baby car seats, are not hazardous products in the usual sense, though certainly poor quality products of this type can represent "a danger to the .... safety of the public", thereby justifying the concerns of those administering the Act.

What stands out most sharply from the list of items in Table 2 is the strong emphasis given risks to children and infants. Nineteen of the thirty-one items in Part I and thirteen of the thirty-four items in Part II relate specifically to products used by children. Other more general regulations, such as the important hazardous substance regulations in Part II, are concerned primarily with the hazards confronted by children. An emphasis on child risks could emerge from benefit-cost calculations as a result of the high probability of accidents to this population segment and the amenability of the relevant risks to regulatory solutions. They could alternatively be the result of a weighting scheme in which infant and child accidents are translated into particularly heavy losses. Some of the suggestions that have been put forward for valuing lives in terms of "potential years of life" or "quality adjusted life years" would have the effect of explicitly introducing this type of weighting procedure.[53] The attention to child risks in the Canadian regulations stems in part from a recognition of the particular vulnerability of this population segment. However the significantly greater priority attached to these hazards in the Canadian system, than for example in the U.S. and British systems of product regulation, suggests that the emphasis on child risks is due, in part, to the implicit weighting system used by Canadian regulators.

(2) General Effects

The Hazardous Products Act is now a little over a decade old and one might expect that the regulations introduced in this 10 year period would have begun to have a significant influence on the overall rate of accidents related to the use of consumer products. Most product-related injuries of consequence are treated in doctor's offices or at hospital emergency departments and ideally one would want to examine the trend in such treatments in an attempt to determine the possible influence of product safety regulations. The absence of an accident reporting system in

Canada makes it necessary to resort to second and third best data sources. For this analysis of the general influence of the Act we have made use of the data on hospitalized accidents in B.C., published by the Hospital Programs Branch of the B.C. Ministry of Health.[54] This data has been published over a reasonably long period of time and unlike the morbidity data put out by Statistics Canada, it allows household accidents to be distinguished from industrial, recreational and motor vehicle accidents. While the match between home or household accidents and accidents associated with products in the Schedule to the Hazardous Products Act is not a perfect one, it is sufficient for the purposes of this general overview.

The B.C. accident data for the years 1963-1977 were used to estimate a model of the form:

$$R = a + b_1 Yr + b_2 \%Pop + b_3 D + u$$

where R is the number of hospital cases in B.C. due to home accidents per 1000 population; Yr is a time trend variable; %Pop is the proportion of the B.C. population in those age groups with a very high rate of hospitalization due to home accidents (i.e. 0-4 and 60+); and D is a post-regulation dummy variable which is equal to one for the years 1971 to 1977. To allow for the phased introduction of product regulations and possible lags in the program's impact the dummy variable was set equal to one over 1972 to 1977 and over 1973 to 1977 in subsequent regressions. The time trend term is included to capture all omitted technological and risk-exposure factors as well as hospitalization trends that move smoothly over time. The data on B.C. home accidents used for the dependent variable have been adjusted to exclude "transportation accidents" around the home, and "purposely inflicted injuries" in the home. An adjustment has also been made for the inclusion of secondary accidents (which may not have occurred in the home) in the published B.C. data; the accident data used in this study pertain only to primary accidents.

Applying this model to 15 observations with D = 1 for the years 1972 to 1977 yields:

$$R = 2.71 - .03Yr + .16\%Pop + .19\ D$$
$$\quad (1.70)\quad (-.94)\quad (2.44)\quad (1.27)$$
$$R^2 = .83$$

The sign on the population variable is in the expected direction, and as the t- value reported in brackets beneath the coefficient indicates, it is statistically significant at the usual confidence levels. The positive sign on the dummy variable suggests that unspecified factors may have had an upward influence if anything on the rate of home accident hospitalization in B.C. over the 1972 to 1977 period, but the coefficient in this case is not significant.

The above regression was run with accident days in B.C. due to home accidents as the dependent variable, but this didn't notably change the results. A substantial portion of home accidents in B.C. are due to falls, and this is an accident area where the product safety regulations are likely to have little influence. When hospital cases due to falls were excluded and D was set equal to one over 1973 to 1977 the coefficient in the regulation dummy became negative, but only barely so and the results were far from significant. The regression runs that did yield quite different results were those that focussed on the home accident rate of children 1-4. Taking the post-regulation period as the years 1973 to 1977 and allowing the dependent variable R to represent the number of hospital days resulting from home accidents per 1000 children 1 to 4 in B.C., gives the following results:

$$R = 95.40 - 1.33\ Yr - 16.21\ D$$
$$\quad (22.09)\quad (-1.93)\quad (-2.57)$$
$$R^2 = .82$$

The estimated 16 day annual reduction in hospital days per 1000 children is statistically significant at the 97 per cent confidence level. The results of this regression are consistent with the hypothesis that product safety regulation has reduced the severity of home accidents and/or the number of severe accidents among young children. If these results were applicable to other provinces they would suggest an overall saving of over 22,000 hospital days per year and about $4 million (at 1979/80 rates) in hospital costs. This is only a small portion of the total savings that are potentially available, and so more important than the specific findings is the support these results provide for the general view that the Act has been effective in reducing accidents. The distinction between the results for children 1-4, and the result for all population segments in the province, correspond with the very heavy emphasis of the regulations on risks confronted by children and infants. While there could be other factors, besides product regulations contributing to the estimate obtained for the dummy variable, the different regression results are sufficiently consistent with expectations based on the pattern of regulation to provide at least strongly suggestive evidence of the effectiveness of the Act.[55]

The limitation of the data used in the analysis needs emphasizing. Hospitalization data are too crude to allow detection of any impacts except those which are substantial and which relate particularly to very severe types of accidents. An analysis based on the trend in product-related emergency treatments would quite conceivably show a more pronounced impact among a broader population segment. Moreover, the cost of most regulations introduced under the Hazardous Products Act are relatively low. Taking into account both the additional production cost and the forgone consumer surplus arising from the application of product standards and bans, it is quite unlikely that more than a few of the regulations under the Act would constitute a "major" regulation as this is presently defined by the federal government for the purposes of its program of prior

review.[56] Indeed as compared to $10 million threshold established for this program, most product safety regulations involve annual direct and indirect social costs of under $2 million. This suggests that it may be possible for particular regulations to have a very modest impact on accident rates and to still prove highly desirable on the basis of benefit cost calculations.

(3) Specific Regulatory Impacts

In this section we examine the impact of selected product safety regulations. An examination of particular regulations will provide an alternative perspective on the effectiveness of the Hazardous Products Act, and allow an evaluation of regulatory activities in the context of the theoretical concepts developed in the first section of the study. The regulations we have chosen to focus on are, we believe, representative of major types of regulatory activity in the product safety area. There is for one, what might be regarded as the basic concerns of governments over dangers in the areas of hazardous substances and flammable products. Legislation had been passed at a very early date in a number of countries to address both types of hazards. It is significant that while U.S. regulations were in existence Canadian officials chose to follow a different course and one marked by generally lower compliance costs in responding to both of these "traditional" hazards. Hazardous substances, the representative of this group for which the more adequate data is available are examined in the following subsection. The broad group of regulations dealing with the products used by infants and children can usefully be regarded as comprising another general class of product safety regulations. Regulatory activity in this area has reflected the authorities heightened sensitivity to the risks faced by young children, and for many of the products in the group Canada has been the leading country in developing regulatory initiatives. We will look at the regulations pertaining to hazardous toys, and to rattles,

pacifiers and cribs. A third general area covers regulations directed at what we may broadly term "life-saving" products. Regulations designed to ensure the effectiveness of these products raise some distinct problems and they require separate consideration. The two major regulations in this group pertaining to hockey helmets and children's car seats are examined below.

Product safety activities can be differentiated not only by the type of products and hazards being addressed, but also by the importance of the initiative in terms of the costs it imposes on producers and consumers, by the nature of the intervention - whether it involves the provision of information, the establishment of a standard, or the removal of a product from the market, and by the circumstances surrounding intervention including in particular the nature of the demand for government regulation. As noted earlier, most product safety regulations involve comparatively minor compliance costs. The study does, however, include those few regulations, such as the child car seat standard, the 1.5 litre soft drink bottle ban, and (to a lesser extent) the safety glass requirements, that stand out because of the size of the market they affect and the costs they entail. The regulations examined below also illustrate the use of alternative policy instruments; while the provision of information was an important component of the approach towards hazardous substances, a product ban was adopted in the case of 1.5 litre soft drink bottles, and product standards were established for other products discussed, including toys, hockey helmets and car seats. In terms of the circumstances surrounding the development of various regulations it's useful to distinguish between situations where, as in the case of pacifiers, the department initiated a review of the evidence and determined to its own satisfaction that there was a need for regulation; from situations, as in the case of hockey helmets, where the initiative originated with an independent association; and still other cases, as with 1.5 litre like bottles, where the hazard received wide publicity and the demand for regulation was

fuelled by media coverage. The case studies describe regulations introduced under different types of conditiions and they indicate that public expectations and demands can at times be an important variable in explaining the government's regulatory activities.

(i) Hazardous Substances

As noted, the hazardous substance regulations were among the earliest regulations issued under the Act, and the problem of hazardous and particularly toxic substances was the source of much of the concern underlying the initial demand for a Hazardous Products Act. The main regulations in this area are those issued in 1970 applying to items 1 to 11 in Part II of the Schedule; however, a significant number of items prohibited under Part I (i.e. items 2,3,8,9,12,17,20-24,26, & 28) are also most appropriately considered as hazardous substances. The regulations in this area are directed at dangers due to the toxicity, flammability and corrosiveness of certain substances, and the explosive potential of some household containers. In the case of a few of the items in Part I (i.e. items 21,26,29 & 30) the main concern is with the health risks due to the potentially carcinogenic nature of the substance. The approach to the problem of hazardous substances has involved product bans, the imposition of labelling requirements, and the establishment of requirements for both labelling and the use of child-resistant containers. Product bans have generally been restricted to substances which involve serious health risks, and which are extremely toxic or flammable. The main thrust of the department's efforts in this general area has gone towards providing information and educating the consumer about the need for the cautionary handling of certain substances. The courts have made it clear that manufacturers are liable if their products do not contain adequate warnings of the dangers associated with the use and handling of their products.[57] The hazardous substance labelling requirements of the Act, therefore, serve in part to

spell out more precisely the manner by which manufacturers can fulfill their responsiblity to inform consumers about known product risks.

The hazardous substance regulations address a number of fairly distinct hazards and different considerations are involved with respect to each. The most important risk in this general area, however, is poisoning and this is a hazard which, on the basis of the criteria developed in Part I of the paper, is uniquely suited to an informational approach: the nature of the danger is very easy to comprehend; it is generally recognized that there is high probability of substantial harm from misuse of poison products; and the time and effort required to take necessary precautions, such as appropriate storage, are negligible. This does not mean that an informational approach will necessarily provide a sufficient policy response to the risks arising from poisonous substances. Even when an information program is very effective a significant number of individuals are likely to remain oblivious to the relevant hazards. A more restrictive policy approach, therefore, could yield a substantial payoff in some circumstances. For some hazardous household chemicals child-resistant containers may offer a significant increased margin of safety at a minor additional cost in terms of both production expense and added consumer inconvenience. The much more restrictive approach of imposing a product ban will be desirable in some circumstances, particularly where the substance is extremely toxic (i.e. where ingestion of a very small quantity can result in immediate death) and where the resulting welfare loss to consumers is not substantial (i.e. where reasonable substitutes in terms of price and quality are readily available on the market). The potential effectiveness of information suggests, however, that a program designed to increase consumers' sensitivity to poison hazards can be an important component of a multi-faceted regulatory response to the problem of toxic substances.

While the total resources devoted by CCA to informational activities in the product safety area are quite small, fairly extensive efforts have gone into developing a system to facilitate the identification of poison and other chemical product hazards, and to educating consumers about the risks from hazardous substances. In a recent review of the warning systems adopted in a number of countries, the OECD noted that Canada had developed "the most elaborate system of warning labels for hazardous household cleaning products".[58] A survey undertaken for the Department of Consumer and Corporate Affairs indicates that a high proportion of individuals (including a substantial number of children) are aware of, and comprehend, the established symbols for toxic and flammable substances.[59] As one might expect, the level of awareness with respect to the explosive and corrosive symbols was considerably lower. Table 3 compares the results from this survey with evidence that has been gathered on the effects of other types of labelling programs. The relatively high level of consumer responsiveness to labels on toxicity and flammability can be attributed both to the nature of these problems and the considerable incentive given consumers to heed information in these areas, and to the well-planned and sharply focussed efforts of the department to inform consumers about hazardous substances.

The effectiveness of the regulations related to poisoning were tested by examining select data on hospitalizations, and poison reports compiled by the Department of Health and Welfare. In the case of hospitalization, attention was given to the number of children 0-4 hospitalized due to the toxic effect of petroleum products (ICDA, No. 981) and the toxic effect of corrosive aromatics, acids, and caustic akalis (ICDA, No. 983). The number of hospital cases in these categories per 1000 children 0-4, N, was run as a function of Yr, a time trend variable, and D, a post-regulation dummy which is equal to one for the years 1972-76. This simple model run over the 1960-76 period yielded the following results:

TABLE 3

EVIDENCE OF EFFECTS OF SELECTED INFORMATION DISCLOSURE REQUIREMENTS
(Unless noted, proportions refer to entire sample.)

	DISCLOSURE REQUIREMENT				
	NUTRITION LABELING	UNIT PRICING	TRUTH IN LENDING	OPEN DATING	HAZARDOUS PRODUCT REGULATION SYMBOLS
Awareness of information	26% saw label	60% to 70% awareness of concept	57% of all credit noticed some credit information	65% noticed	Poison 91% Flammable 83% Explosive 49% Corrosive 44%
Comprehension of information	16% understood label	50% understood meaning of concept	34% correctly reported interest rate on a recent purchsase	36% knew that pull date was used	Poison 80% Flammable 78% Explosive 39% Corrosive 26%
Claimed use of information (one or more times)	9% used labels at least once	30% to 50% used in buying decision	10% of all credit buyers used in last durables purchase	20% found tag helpful	Poison 73% * Flammable 73% Explosive 67% Corrosive 66%

Note: * % of those who bought product with symbol who took special storage precautions.

SOURCE: All information except that pertaining to the Hazardous Product Regulations comes from: George S. Day, "Assessing the Effects of Information Disclosure Requirements," Journal of Marketing, 40, (April 1976): p. 46, Table 2.
The Hazardous Product data is from: A Study on Awareness and Identification of Hazardous Product Symbols, prepared for Consumer & Coporate Affairs Canada by Contempary Research Ltd., Jan/1977.

$$N = .45 + .02Yr - .15 D$$
$$(11.29) \quad (3.43) \quad (-2.63)$$
$$R^2 = .45$$

The regression indicates that the rate of hospitalization due to the particular forms of poisoning analysed was significantly lower in the post-regulation period than one might expect based on previous trends. The results, which are statistically significant as indicated by the t-values given in brackets, are consistent with (though they do not prove) the hypothesis that regulation has had a positive influence in reducing the rate of accidental poisoning due to chemical products in the home.

The data on poisonings collected by local poison control centres and reported to the Department of Health and Welfare provides additional supporting evidence for this conclusion.[60] The model employed to test this data was of the form:

$$N = a + b_1Tot + b_2D_1Tot + b_3Yr + b_4D_2 + u$$

where N is the number of reports of poisonings of children 0-4 due to household chemicals covered by the Act; Tot is the total number of reports of poisonings of all kinds (excluding non-narcotic analgesics) for children 0-4; Yr is a time trend variable; D_1 is a dummy introduced to allow for the possible effects of the amendment to the Food and Drug Act in the mid-60's and set equal to one for the years 1966 to 1975; and D_2 is the post-regulation dummy which is made equal to one for the years 1973 to 1975. The data collected by Health and Welfare is based on reports received from a changing mix and number of hospitals. The Tot variable is included to control for changes over time in the size of the reporting sample. The D_1 Tot variable is intended to adjust for the possibility that the trend in total poison reports was influenced by the amendment to the Food and Drug Act. Non-narcotic analgesics have been excluded

because of recent drug regulations which have influenced the number of poisonings related to this drug class.

The results of applying this model to data for the years 1960 to 1975 was:

$$N = \underset{(1.98)}{792.76} + \underset{(6.91)}{.31Tot} - \underset{(-0.61)}{.009D_1\ Tot} - \underset{(-1.70)}{67.6\ Yr} - \underset{(-2.60)}{333.80\ D_2}$$

$$R^2 = .99$$

The coefficient on the D_2 variable is significantly different from zero at the 95 per cent confidence level. The estimate that regulation has contributed to a reduction of 333.8 poison reports (in the specified category) per year supports the earlier findings and strengthens the general conclusion that the product safety regulations have been effective in reducing the incidence of household chemical poisoning among children.

The benefits of the hazardous substance regulations in terms of reducing poisonings must be set against the associated information and packaging costs, and the reduction in consumer satisfaction owing to the removal of certain products from the market. The information costs of the program have been minimal. While CCA's efforts in promoting warning labels have been significant they have not been very costly (as can be gathered from the previous data on the total information budget). Manufacturers are legally liable in common law if they do not provide the consumer with information on hazardous substances, and the additional expense of having the labelling conform to the requirement of the Act would be very small. The disparity between hazardous product labelling requirements in Canada and those in the U.S. and elsewhere causes additional problems for foreign producers of household chemical products selling in the Canadian market; however, it does not appear that the minimal additional cost of meeting Canadian requirements has constituted a significant impediment to household chemical imports. (The

Canadian authorities have permitted the required Canadian labels to be pasted on to existing foreign labels, thereby reducing the additional cost of meeting Canadian requirements.) The direct costs of complying with the regulations concerning child-resistant containers is also estimated to be quite low (around 1 cent per container), though this will vary between manufacturers depending in part on their output and their ability to spread the capital costs of the required capping machinery.[61]

The potentially most costly regulations are those banning the use of certain types of substances in consumer products. In most cases these prohibitions apply to a narrow group of products and reasonable substitutes are available. For example, the ban on the use of hydrocyanic acid in metal polishes apparently eliminated one extremely toxic silver polish from the market; most polishes in use relied on alternate less toxic substances. The (direct and indirect) restriction on the use of lead in paints is not especially serious in view of the ready availability of non-lead based paints. Lead has some unique advantages as a drying agent for paints which are to be applied in low temperatures, but this is a significant benefit mainly for certain house paints, and for this and related products the use of lead has not been restricted, only proper labelling is required. In some other cases, where reasonable substitutes are not available, products or substances have not been taken off the market because of the attendant costs. In the U.S., for example, non-industrial contact cements may not contain highly flammable solvents, and substances such as Trichloroethane have been suggested as substitutes by the U.S. Consumer Product Safety Commission.[62] Trichloroethane is more expensive than solvents such as naptha, acetone, heptane and toluene which are commonly used in contact cements, and the Product Safety Division has rejected the U.S. approach, opting instead for the application of strict labelling requirements.

This general review has not addressed a number of questions which bear upon the contribution of the hazardous substance regulations to the efficient production of safety. It is conceivable that some important products have been ommitted from the Schedule and that net benefits are therefore significantly lower than they might otherwise be. (An extensive study of accident data and epidemiological evidence would be required to attempt to answer this question) While the department appears to have capitalized on the potential of an informational approach, and exercised the necessary caution in the use of product bans, it is not clear that the most desirable policy instrument has been selected in all cases.[63] The analysis suggests, however, that the direct and indirect costs of the hazardous substance regulations are relatively low and that in the main accident area of poisoning, the regulations have been effective and have yielded substantial benefits.

(ii) Rattles, Pacifiers, and Cribs

From a regulatory perspective these three infant products have some important common features: they all involved hazards which most consumers would not know, or even suspect, existed; they all involved technical problems of a medical or anthropometical nature with which the producers themselves were ill-equipped to deal; and in all cases once the basic problem was understood it seemed amenable to a solution involving fairly minor and relatively inexpensive production changes. One might reasonably expect that if consumers and producers had more complete knowledge the market would respond on its own with the production of higher quality and less hazardous products. Rattles, pacifiers and cribs were all, therefore, especially attractive candidates for government regulation.

In the case of pacifiers, the department was alerted early in its existence to a number of fatalities that had occurred when the cord of the pacifier caused strangulation and when part of a

broken pacifier lodged at the back of a baby's throat causing suffocation. A review of inquest results and accidental death reports in the province of Ontario indicated that in this one province alone over about a one year period (mainly in 1972) two to three deaths resulted from pacifiers. Over 1972 and 1973 some university researchers in the field of pediatric dentistry were commissioned to undertake an extensive analysis of the inherent dangers in pacifier design. The results of this research led to the development of the regulations issued May 1974 requiring that: pacifiers be of sufficient strength to withstand reasonable force even after repeated boiling; the guard or shield be large enough and rigid enough to prevent the child from inserting the nipple too far in his mouth; the attached cord be too short to extend around an infants neck; and the materials used in the pacifier be non-toxic, and sterile at the time of sale.

Rattles were among the items covered in the original toy regulations introduced in 1970, however, the main regulatory requirement designed to address choking hazards involving small rattles was not issued until June 1977. As in the case of pacifiers, reports to the department indicated the existence of a significant hazard, the probability of which was sufficiently small that the public was unaware of its existence. Again, the product hazard raised a technical problem to which no one had the answer: in this case the problem was to find the minimum size required for a rattle to eliminate the risk that it could lodge in the throats of infants. Research undertaken for the department resulted in the development of a template based on the dimensions of a child's mouth and indicating the size specifications necessary to ensure that a rattle could not project into an infant's throat to a depth that could cause choking. This template formed the basis for the 1977 Canadian regulations and it was adopted in the U.S. regulations issued a year later.

It is not apparent from a limited examination that the price of rattles and pacifiers increased more substantially than that of related infant products in the period subsequent to the regulations. Both sets of regulations involved increased manufacturing costs, mainly associated with the expense of modifying or replacing production molds for those products which did not comply with the standards. Most rattles are imported from the Orient, particularly Hong Kong, and in this case the initial cost would be borne by foreign producers. U.S. studies have suggested that the required mold changes and associated retooling costs could lead to price increasing of around five cents for pacifiers and perhaps marginally higher for standard plastic rattles.[64] However, the price-competitive nature of these markets could have discouraged efforts to pass compliance costs on to consumers; it has been noted, in this respect that when the pacifier industry changed molds to meet a 1972 U.S. proposal, the resulting costs were largely absorbed by manufacturers themselves.[65]

The pacifier regulations have had some other effects which are more difficult to evaluate. The harder rubber used to comply with the regulation has increased the durability and the expected life of the products; at the same time, however, there have been complaints that, because of their increased rigidity, the new products are less effective in pacifying infants. One report suggested that the introduction of the Canadian regulation gave rise to a "bootleg traffic" with significant numbers of Canadian mothers purchasing their pacifiers south of the border.[66] There is no unanimity in the view that product safety regulations have substantially reduced the quality and usefulness of pacifiers. The effect does not seem to have been such as to negate the favourable impression that emerges from a consideration of the substantial risk-reduction benefits and the relatively minimal compliance costs associated with the pacifier standard. The pacifier regulations, however, serve to highlight the basic complexity of the regulatory function and the very

difficult task regulatory authorities have in attempting to act on behalf of consumers. Even the simplest regulations will often have side effects and unintended consequences that can substantially alter the nature of the tradeoffs involved and the desirability of government intervention.

In the case of cribs, the main problem has involved infants falling through the slats of the crib and there have been a number of fatalities due to this cause. This problem was given prominent attention in the hearings of the U.S. National Commission on Product Safety, and it was the subject of a major research study subsequently commissioned by the Bureau of Product Safety of the U.S. Food and Drug administration - the percursor of the CPSC.[67] The U.S. study indicated that a slat spacing of 2 3/8 inches could protect 95 per cent of all infants and the voluntary standard of 3¼ iches then being adopted by the crib industry was inadequate. The 2 3/8 inch figure formed the basis for the U.S. crib regulation published in the Federal Register in April 1973. In Canada crib regulations were issued in October 1973 addressed to slat spacing and a number of other potential hazards, such as the risk of infants falling over the top of cribs, and the risk of babies getting themselves caught under the end panels or between the mattress and the sides of the crib. The Canadian standard set the maximum distance between upright bars at 3 1/8 inches, because of a concern that the narrower distance established in the U.S. would allow infants to get their limbs trapped between the bars and thereby contribute to serious injuries of a different nature. Subsequent reports of a number of (non-fatal) accidents in post-regulation cribs convinced the Canadian authorities of the advantages of the U.S. standard and amendments have recently been introduced to bring Canadian slat-spacing requirements into conformity with those in the U.S.

The Canadian crib regulations were largely incremental in their impact since, unlike the situation with respect to rattles and pacifiers, the major proportion of producers serving the

Canadian market - including importers and Canadian producers who export to the U.S. - would have adjusted to comply with the more stringent U.S. standards. There was concern that if there was no Canadian regulations in this area or if Canadian regulations lagged very far behind U.S. legislation, the Canadian market would become a main source of disposal for substandard U.S. cribs;[68] by developing Canadian crib standards which came at least partially into effect about the same time as the U.S. regulation, this problem was avoided. (i.e. The Canadian slat spacing requirement was made effective Jan'74, while the U.S. crib regulations came into effect Feb'74). Compliance costs were much more substantial for the crib regulations than for the rattle and pacifier regulations. At the time of their adoption, for example, the CPSC estimated that U.S. rules governing the design and construction of cribs would add between $5 and $15 to costs. At the same time the risks associated with cribs and the magnitude of the potential gain from an effective standard were much larger than in the case of pacifiers and rattles. In 1973 the NEISS estimate of the number of accidents in the U.S. involving cribs was 8641; the comparable figure for rattles and pacifiers was 144 and 80 respectively.[69]

Analyses of the data available in the U.S. and Canada suggest that the crib regulations have been highly effective in reducing crib-related accidents and deaths. In one study undertaken by the CPSC the impact of the Commission's safety activities was tested by a multiple regression analysis based on monthly data from NEISS on crib-related injuries between 1972 and 1977.[70] This analysis found that regulatory activities did have a significant impact on the number of crib-related injuries, and it estimated that they were responsible for a reduction of about 44 per cent in crib- related injuries treated in hospital emergency rooms in the U.S. The decline in the injury rate was found to begin very soon after the implementation of the U.S. standard, suggesting that the informational and educational activities of the CPSC were highly effective. An examination of

death certificate files in selected U.S. States indicated that crib-related deaths per million infants 0-35 also declined substantially in the years following the introduction of the U.S. regulations. Canadian data on infant death rates support these findings. The data in Table 4 were compiled by examining the detailed cause of death for all infants categorized as dying due to accidental mechanical suffocation in bed and cradle (E913.0).[71]

Table 4
Crib-Related Accidental Deaths

	1974	1975	1976	1977
Number of crib-related deaths	17	10	9	8
Deaths per million infants 0-3 years old	12.2	7.2	6.5	5.7

The data in this Table represent minimum estimates of the number of crib-related deaths since a significant number of cases where details on the cause of death were incomplete or unclear have been excluded. The very marked decline in crib-related deaths in the first year, which is similar to what occurred in the U.S., could be partly attributable to increased public awareness and the success of the department's informational and educational activities.

It was noted in Part I that the establishment of regulatory standards is likely to prove most desirable where there is a relatively well-defined hazard which is amenable to a simple relatively low-cost change in product design and construction. While the solutions to the problems involving pacifers, rattles, and cribs were not completely free of complications, and while in the latter case costs were not insignificant, these three product safety areas generally comply quite well with the criteria for a standards approach. In all three cases the authorities identified a basic product failing and responded on the basis of a well-researched technical study. There is good reason to expect that standards established for these products have been effective

and that they yield benefits well in excess of the costs to which they give rise.

(iii) Hockey Helmets

The development of the standard for hockey helmets originated with the concern of the Canadian Amateur Hockey Association (CAHA) about the frequency of head injuries to amateur hockey players wearing helmets. Through the facilities of the Canadian Standards Association and the joint efforts of several groups including the CAHA and the sports equipment industry a voluntary hockey helmet standard was developed by 1973. The CSA standard was mandated by CCA, and became a requirement for any helmet advertised, sold or imported into Canada as of January 1, 1974. The hockey helmet standard is regarded by the department as one of the success stories in the product safety area, and there is some favourable evidence on the pattern of hockey head injuries in the CAHA to support this assertion.[72] It is not clear, however, what effect the standard has had on the overall rate of injuries among existing and potential helmet users. Since all CAHA players are required to use certified helmets - and would continue to do so even in the absence of a product safety regulation - the relevant measure of the regulation's impact is the rate of head injuries among that large amorphous group of helmet users whose choice in the market was effectively restricted by the hockey helmet regulation.

Hockey helmets are not hazardous products in the same sense as poisonous substances or highly flammable clothing; the helmet regulations are not designed to eliminate certain undesirable product characteristics but to establish general product performance criteria. While the latter type of performance standard can be much more restrictive of consumer choice, the associated welfare loss to consumers may not be substantial. If, for example, the only characteristic of a helmet of interest to

consumers was the degree of protection it afforded, and consumers were virtually unanimous in desiring a helmet providing maximum protection, a standard expressing this "common preference" would not involve any significant sacrafice by consumers. If, on the other hand, consumers of hockey helmets have different needs in terms of head protection, if consumers have quite different attitudes about the inconvenience or disutility associated with wearing various helmets, or if they differ significantly in the amount they are willing to pay for increased head protection, a standard can involve a considerable restriction in choice and a substantial loss in consumer welfare. A particularly serious concern must be that some potential consumers will be sufficiently dissatisfied with the price and quality of regulated helmets to reject the use of helmets altogether; in this case the overall reduction in risk from the use of regulated helmets would be at least partly eroded by the reduction in the use of protective headgear.

Some understanding of the effects of the helmet standard can be gained from an examination of the data collected by the B.C. Amateur Hockey Association.[73] Over the 1973-74 season when this survey was conducted, those players who wore CSA-approved helmets had a far lower proportion of forehead lacerations, and a much lower incidence of concussion and other head trauma (such as a bruised forehead and contused temple). Based on the reported injury rates, the CSA helmet was 95 per cent effective in eliminating the risk of forehead lacerations and 85 per cent effective in eliminating the risk of concussion. The potential benefits available from having players using non-approved helmets switch to the certified brands can be evaluated by using the B.C. data on head injuries and some illustrative figures of the costs (including some allocation for pain and suffering) of forehead lacerations, concussions and bruises, contusions, etc. Table 5 provides an estimate of the benefits available over one season to 100,000 players. In deriving these estimates,

reference was made to an Ontario study indicating that about 5 per cent of forehead lacerations and 1/3 of head traumas involve disability of over one week.[74]

Table 5
Benefits of the CSA Helmet Standard - 100,000 Players over One Season

Injury	Decline in Injuries due to CSA Standard	Value Assigned to Injury $'s	Total value of injury Reduction $'s
Mild forehead laceration	264	50	13,200
Serious forehead laceration	14	1000	14,000
Mild Concussion	57.8	200	11,600
Serious Concussion	19.3	1000	19,300
Mild head trauma	6.6	200	1,300
Serious head trauma	3	1000	3,000
			62,400

To get a complete estimate of benefits it's necessary to allow for the fact that a helmet typically lasts over several seasons. If helmets are used from 3 to 5 years then the present discounted value of the benefits to 100,000 players would range from $170,000 to $260,000. The corresponding cost of the resources required to upgrade the helmets to the CSA standard would depend on the average quality of non-approved helmets. Industry data suggest that the costs of upgrading a higher quality helmet to CSA standards would be modest - about $1 a helmet. For the lower quality helmets - those selling for $5 and under - the cost increase would probably be several times higher - i.e. around $3 a helmet. In the Table below approximate benefit-cost ratios have been calculated using the previous estimate of benefits and various cost estimates. The $1.66 cost estimate would correspond to a situation in which 1/3 of the helmets on the market prior to the regulation were of the $5 and under variety; the $2 estimate represents a situation in which half the pre-regulation helmets in use were relatively inexpensive brands.

Table 6
Benefit-Cost Ratio of CSA Standard - Based on Injuries
To Average Amateur Hockey Player

Life of Helmet	Average Cost Increase $1	$1.66	$2
3 years	1.7	1.03	.85
5 years	2.6	1.6	1.3

The benefit calculations did not take account of the possibility that an injury associated with the use of a non-approved helmet could be fatal. While the probability of a fatal injury in hockey is exceedingly low, it is not zero, and a few hockey deaths in the late 60's have been directly attributed to the use of inadequate protective headgear.[75] Adjusting the results in Table 6 to take account of this additional factor reinforces the impression that the CSA standard and the accompanying requirement that amateur hockey players use certified helmets were cost beneficial.

The calculations in Table 6 were based on the injury experience of the average player in the B.C. AHA. However, the B.C. survey indicates that there are major differences in the probability of injury depending on the age of the player and the division to which he belongs. This disparity in injury rates comes through particularly clearly from another survey of injuries among B.C. amateur hockey players, this one extending over the ten year period 1963-72.[76] This latter survey indicates that the probability of a forehead laceration was almost five times greater for a Junior B player than for a player in the Bantam division; the probability of a concussion was 5½

times greater for the Junior B player. To get a perspective on the effect of the helmet standard on these two different groups of players calculations similar to the previous ones were performed using the data from 1963-72 B.C. study. The values assigned to various injuries and the assumptions with respect to cost are the same as in the previous example.

Table 7
Benefit-Cost Ratio of the CSA Standard to Bantam and Junior B Players

Life of Helmet	Average cost Increase $1		$1.66		$2	
	Junior B	Bantam	Junior B	Bantam	Junior B	Bantam
3 Years	4.5	.9	2.7	.5	2.3	.4
5 Years	6.9	1.4	4.2	.8	3.5	.7

These results suggest a very wide difference in the net benefits accruing to the two groups of players. While under all assumptions the standard provides substantial net benefits to the Junior B players, its contribution to the welfare of Bantam players is much more questionable. Adjusting the ratios to include the contribution of the helmet standard to a reduction in the probability of a fatal injury would probably raise all the 5 year benefit-cost ratios to over one; but based on the 3 year assumption and the two highest cost estimates it would be necessary to assign an extremely high - and probably unrealistic - value to the reduction in the risk of a fatal injury, to make the standard cost-beneficial for Bantam players.

This example indicates that helmet users do in fact have widely differing protective needs. Helmets designed according to a single standard may compel some users to purchase more protection than they would if they had the necessary information on risks, and it may lead other users to purchase a less than appropriate amount of protection. While the Junior B players in this example would receive substantial gains from upgrading their helmets to the CSA standard, it is probable that net benefits to this group could be increased by the use of still higher quality

helmets. The expectation that there are further gains to be realized from increased head protection receives some support from a detailed study of the CSA standard. Based on the use of a mathematical model of head protection, Bishop comes to the following conclusion:

> How adequate, then, is the protective standard established for ice hockey helmets? At first glance, it appears that the CSA criterion satisfies design measures in terms of helmet liner thickness and tolerable levels of linear head acceleration. However, this conclusion is warranted only if the impacts encountered in game and practice conditions are on the order of 11 feet (3.35 meters) per second. As the model evaluation demonstrates, any helmet built to satisfy only these specifications can be expected to fail when subjected to impact velocities more likely to occur in the hockey environment - about 20 feet (6.1 meters) per second.[77]

The establishment of a standard does not, of course, preclude the marketing of helmets with protective qualities well above the minimum prescribed level. However, since a standard does not distinguish between helmets which barely meet the performance criteria and those which excel in performanance it will tend to discourage production and sales of the higher quality product. While a standard fills a useful informational role, it can also provide misleading signals in failing to distinguish between the performance characteristics of different brands where these are crucial to the consumer's decision. These general considerations suggest that while the CSA standard and the associated CAHA requirement that its players wear certified helmets produced positive net benefits, these benefits were probably significantly less than those which would result from a more flexible approach which was more responsive to the separate needs of different groups of players.

In evaluating the product safety regulation which mandated the CSA standard, it is necessary to take account of differences in protective requirements and the related possibility that in the case of users who have freedom of choice in their use of equipment the regulation could contribute to a reduction in the use of helmets. Hockey helmets have been used in a variety of circumstances - in neighbourhood hockey games, by young children learning how to skate, for lacrosse games, in skateboarding, and by young children riding bikes or riding on back carriers; it's reasonable to expect that a regulation restricting the variety of helmets on the market and eliminating the supply of relatively low-cost helmets would have some influence on the demand for, and overall use of, this product. Any decline in the use of helmets must be set against the gains that arise due to the enhanced protection provided by regulated helmets. In cost-benefit terms the essential question is whether:

$$G - C > L - S$$

where G represents the gain from the use of certified helmets (as opposed to unapproved helmets) in terms of reduced hospital and injury costs; C represents the costs of upgrading helmets to the level established by the standard; L represents the increase in hospital and injury cost to those who were discouraged from using a helmet because of the price and/or quality effects of the regulation; and S represents the resource savings associated with the diminished use of helmets.

The calculations for Bantam players in the B.C. AHA suggested that for this group G-C is barely positive, and then only under certain assumptions. If the general (non-CAHA) consumer of hockey helmets is subject to a rate of head injury similar to that of the Bantam player, and L is positive and significant then (G-C)-(L-S) would almost certainly be negative and the costs of the regulation would exceed its benefits. It seems reasonable to expect that the rate of injury to the general

user of helmets would be more akin to that of the Bantam player than the Junior B player. There is insufficient data to determine the response of consumers to the change in price and quality of hockey helmets, but it would be unusual if (non-CAHA) demand was insensitive to the very substantial changes in these aspects. The evidence that is available does not lead to a firm verdict, but it does suggest that the desirability of the helmet regulation is open to very serious question.

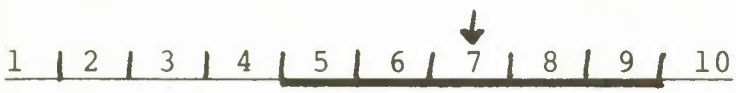
The safety problem in this area would seem more amenable to an informational approach than to a solution based on the use of standards. The safety issue corresponds well to the criteria we established for an informational approach in Part I of the paper. There is no problem here, as there is in many areas of product safety regulation, of a lack of awareness among consumers; individuals who purchase helmets are concerned about risks of head injury and they are seeking a way to reduce that risk. There is the need to provide consumers with the information they require in a simple, easily understandable form (so information processing costs to the consumer are minimal), but this is not a major problem. A policy of providing the consumer with the information he requires to function efficiently in the marketplace has considerable appeal in a situation where there are substantial differences in the needs and preferences of consumers. An informational approach could be highly effective in this area and it would be much less costly, and involve much less "downside risk", than a policy involving the establishment of standards.

Certification by CSA does provide the consumer with a significant degree of information regarding the protective qualities of the helmet. As noted previously, however, the information conveyed by a CSA label is insufficient for many purposes: it does not provide much guidance to the player who wants to purchase the maximum degree of helmet protection on the market, nor does it assist the player who wants to invest less in protective headgear than required for the purchase of a certified helmet.

There is also a danger that the established standard can become a performance ceiling. A more complete and desirable system of information labelling would enable the consumer to compare the protective capacities of different helmets on the market. There are a number of ways this could be done, but a program which has particular appeal is Sweden's VDN comparision labelling system.[78] The VDN comparison scale depicted in figure 6a offers the particularly useful possibility of comparing products other than the ones labelled at the point of purchase.[79]

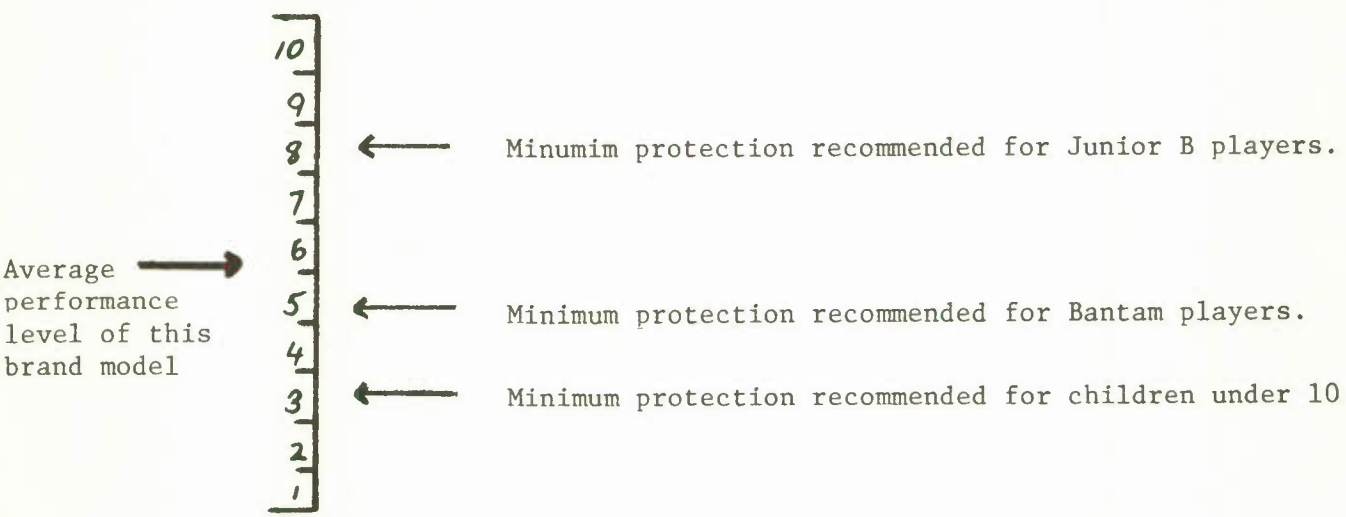
Figure 5a

A Comparison Scale Developed by Swedish VDN Research



Key: ↓ Arrow shows average performance level of this brand/model
▬ Heavy bar shows performance range of other brands/models tested

Figure 5b



In the case of hockey helmets, the adoption of this system would require a regulation to be made pursuant to the Packaging and Labelling Act, requiring helmets to be rated according to their protective capacities (objectively determined using

standard test procedures), and the relevant information to be conveyed in a label of standard design. This systems does not preclude the product safety division or CSA from recommending the use of helmets, offering certain minimum levels of protection. Specific recommendations could quite easily be indicated on the performance scale in Figure 5a or incorporated within alternative rating programs such as the one illustrated in Figure 5b. What is important is that policy in this area respects the widely differing needs and preferences of consumers, and the ability of consumers to make the "correct" market decision when they are provided with the requisite information.

(iv) Safety Glass

In mid-1973 a regulation was introduced requiring that all bathtub enclosures, shower doors and exterior doors for household use be made of safety glass. The addition of glass doors to the list of items in Part I of the Schedule to the Hazardous Products Act was preceded by extensive consultation between industry and government officials, and it followed a 1972 amendment incorporating similar safety glass requirements into the National Building Code. The latter applies to new construction financed by NHA mortgages, and to all new construction in the many municipalites which directly adopt National Building Code standards. The regulation under the Hazardous Products Act extended the requirement for safety glass to the replacement market for glazing products and to that segment of new construction which had been unaffected by the National Building Code revision.

In reviewing this regulation the question that arises at the outset is, "Why should the government intervene in the market for storm doors, patio doors and bath enclosures?" The risk the consumer assumes in using these products cannot be considered "involuntary" in the same sense as applies, for example, to the risk from a defective crib or a unlabelled hazardous substance.

All consumers are aware that glass is an inherently risky product and that if appropriate caution is not exercised the probability of injury is substantial. While consumers may not be able to reliably estimate the probability of injury from ordinary glass doors and while they may as a result inappropriately evaluate the advantages of safety glass, the information problem with respect to glass hazards is clearly of a quite different order of magnitude from other risks which are entirely unperceived. It is reasonable to expect that the market would to some extent respond on its own to the risks posed by glass doors. Moreover, there is no a priori reason to believe that this market response would be inappropriate because consumers systematically and very substantially misjudge the hazards associated with glass products.

The changes to both the Building Code and the Hazardous Products Act were prompted by National Research Council estimates that 10,000 injuries occur annually involving architectural glass. The fact that there were a significant number of injuries, however, is not in itself an indication that consumers were badly informed and thereby assuming greater risks than they were in fact desiring to accept. Fully informed consumers will continue to buy ordinary glass products if they can do so at a price discount which, in their view, more than adequately compensates for its inferior quality relative to safety glazed products.

If the consequences of inadequate information are very serious, government regulation may be warranted even though most consumers are not particularly poorly informed about the specific hazards. The only available data, which comes from the U.S., indicates, however, that most injuries associated with glass doors are relatively minor.[80] Some 85% of accidents involve lacerations, primarily to the hand or finger. Only about two per cent of the injuries require hospitalization. These general considerations do not indicate that the market for architectural glass products was performing optimally, but neither do they

prompt one to suspect that information problems are such that there is likely to be significant net benefits from government regulation.

The results of a recently published study of the safety glass regulation under the Hazardous Products Act are given in Table 8.[81] Tempered safety glass, which is four to five times stronger than ordinary glass, is much less likely to give rise to glass cuts, and it has a longer expected life than ordinary glass. These benefits must be set against the higher cost of producing safety glazed products, and the increase in injuries which result from collision with glass that does not break. The study attempted to measure the present discounted value of the cumulative stream of costs and benefits over a 30-year time horizon (1973-2002), during which the existing stock of doors would gradually be replaced by products purchased subsequent to the regulation and using safety glass.

Table 8

Net Present Values and Benefit-Cost Ratios of the Safety Glass Regulations

	Product Category			
	Storm Doors	Patio Doors	Bath & Shower	Total
		($ million)		
Benefits				
cut-by-glass injuries	19.62	0.92	1.29	21.83
durability	8.65	7.32	1.03	17.00
Costs				
impact injuries	0.63	0.03	0.04	0.70
unit production costs	13.30	28.41	2.09	43.80
Net present Value	14.34	-20.20	0.19	-5.67
Benefit-Cost Ratio	2.03	0.29	1.09	0.87

Source: Fred O'Riordan and Les McCabe, A Case Study: Safety Glass Regulation under the Hazardous Products Act (Ottawa, Minister of Supply and Services Canada, 1980).

Using the most likely set of assumptions it was found that the benefits of the safety glass standard would not justify its costs and that net social costs of over $5½ million (in 1973 dollars) would be incurred. As can be seen from the table, there are large differences in the impact of the program on particular products. While the program was found to be highly undesirable in the case of patio doors, where the cost of substituting safety glass is substantial, the results were marginally positive for bath and shower doors and significantly positive in the case of storm doors. The favourable effect of the standard with respect to storm doors was due to higher frequency of injuries and the comparatively modest cost increase associated with using safety glass in this type of door.

It's worth emphasizing that if consumers are reasonably well informed about glass hazards and the market has been effectively responding to consumer preferences, regulation would be unlikely to produce any net benefits, even in the case of storm doors. It is indeed conceivable that those families who prefer ordinary glass storm doors are not at all ill-informed, but have a lower than average probability of injury (due perhaps to the age of family members), or apply a high discount to future benefits; there could as well be other factors not taken into account in the study, which have the effect of increasing the appeal of ordinary doors to safety-glazer storm doors for some classes of consumers. At the same time, consumers who place a high value on risk reduction are likely to favour safety-glazed patio doors, notwithstanding the results in the study. The study by O'Riordan and McCabe assumes not only that consumers are uninformed, but that they would essentially remain uninformed and that all benefits arising from the increasing use of safety glass over time can be attributed to the product safety regulation. To the extent that the relative share of the storm door market held by safety-glazed products would have increased over time without government intervention the net benefits attributable to the regulation are that much more modest.

It would seem, therefore, that the overall effect of the regulation was significantly unfavourable, and if there was a desire to reduce the number of injuries associated with glass doors other, more appropriate alternatives should have been pursued. O'Riordan and McCabe suggest that patio door injuries could probably be reduced by mandating the use of a metal transom on each panel of the door, or by introducing the simple requirement for a decal strip. They note that most injuries involving sliding glass doors result from the victim's being unaware that the door is closed, and these measures are therefore likely to be quite effective. Another alternative is an information labelling program which helps consumers distinguish between ordinary and safety glass and understand the advantages of the latter. It is significant, in this respect, that consumers are aware of the hazardous nature of glass products. As we noted in Part I, under such circumstances consumers are likely to be responsive to a program which provides important factual information in a clear, easily understandable form. Such a program is likely to have a significant positive payoff and to constitute a reasonable response to the risks associated with glass patio doors, and bath and shower doors. Based on the available evidence a reasonable case for safety glass requirements exists only in the case of storm doors. Even here, however, it is not clear that the market is failing in a major way to perform as it should; a less restrictive program based on disseminating information could well constitute an effective response to whatever information problems exist in the market.

(v) Toys

Toys present a number of problems from a regulatory perspective and toy safety is probably one of the most difficult general areas to regulate. A major concern underlying the regulatory initiatives on toy products is the relatively high rate of injuries to children, and particularly young children under 4. This was a major issue in the U.S. in the late 60's as

a result of some startling figures on child accident fatalities produced by the NCPS.[82] While the more complete data that has become available in intervening years has shown that accident and mortality rates are not as high as originally feared, it is nonetheless true that children are particularly vulnerable to product-related accidents. The data in Table 9 indicate that while the mortality rate of children 1-4 from selected accidental causes is not high by comparison to that for other groups, the morbidity rate for this age group (based on B.C. home accident data) is well above average. More pertinent data produced by the National Electronic Injury Surveillance System (NEISS) in the U.S. based on hospital emergency room treatments (Table 10) indicates that children 1-4 and (to a lesser extent) 5-14, and especially males in these age groups, are subject to a much higher rate of product injury than other population groups.

Table 9

Mortality and Morbidity Rates Based on Selected Accidental Causes - 1977

Deaths per 1000 for Canada

	0-1	1-4	5-14	15-24	25-59	60+
Mortality rate due to poisoning, fires, falls and "all other accidents"*	.321	.100	.036	.083	.133	.760

Hospital days per 1000 for B.C.

Hospital days due to home accidents	70.14	62.09	29.30	26.46	47.35	398.06

* excludes motor vehicles industrial accidents, and drowning

Source: Statistics Canada, Vital Statistics Vol. III Deaths, Cat. No. 84-206 and Estimates of Population by Sex and Age for Canada and the Provinces, Cat. No. 91-202.
B.C. Ministry of Health, Statistics of Hospitalized Accidents, B.C..

Table 10

Product-Related Injuries Admitted to Hospital Emergency Rooms in U.S. 1976

- rate per 1000 pop. -

	0-1	1-4	5-14	15-24	25-44	45-64	65+
Both sexes	30.1	86.3	67.1	57.3	31.2	16.9	13.7
Males	34.4	100.5	86.7	77.6	37.7	17.7	12.3
Female	25.6	71.4	46.7	36.9	24.9	16.1	14.6

Service: Special Report based on NEISS data, Jan 1 - Dec 31, 1976

Source: Directorate for Hazard Identificaiton and Analysis- Epidemiology, Consumer Product Safety Commission, Consumer Product-Related Injuries Treated in Hospital Emergency Rooms Jan. 1976-Dec 31, 1976, Special Report (April 1978).

The U.S. study indicates that children are particularly prone to cuts and lacerations; almost 50 per cent of the injuries to children 1-4 treated in the sample hospitals were lacerations. Poisonings were found to account for about 10 per cent of the reported injuries to children 1-4, as compared to a population average of only 2 per cent.

Canada was one of the first countries to attempt to respond to the concern over child injuries by establishing a comprehensive system of standards for toy safety. The toy regulations originally issued in 1970 and partially amended in 1974 address a range of hazards, including toxicity, flammability, and various electrical, thermal and mechanical dangers. While the U.S. passed the Toy Safety Act in 1969 enabling the banning of toys which presented an electrical, mechanical or thermal hazard, this was essentially stand-by legislation, and it did not extend to the use of proscriptive standards as under the Canadian Act. Until very recently the U.S. has relied almost completely on voluntary standards to contain toy risks. (A regulation prohibiting sharp points only became effective in the U.S. at the end of 1978, and a small parts regulation, similar to item 12(c) in Part II of the Schedule to the Canadian Act, just took effect in the U.S. at the beginning of 1980.)

The data on injuries suggest the potential for large gains in accident reduction through the regulation of toys and related child products; however, a number of other factors suggest that such gains may be difficult to realize. First, the impression conveyed by the injury data needs to be amended to take account of the fact that toys account for only a small proportion of the product-related accidents occurring to children. For children, as indeed for most of the population, the major proportion of accidents are associated with risks which are neither hidden nor involuntary. The U.S. data (again for 1976) indicate that for children 5-14 bicycles were the leading cause of accidents, followed by various sports-related products, swings and slides, glass, nails and skates and skateboards.[83] For children under 5, non-glass tables, stairs, beds, bicycle and swings and slides were the leading products involved in injuries. Toys were a significant factor in injuries to the under 5 group, but they were far down the list. In the case of lacerations, the most common injury to children, toys were involved in about 10 per cent of the reported accidents.[84] About 15 per cent of the accidents involving small parts were associated with toys, but almost half such accidents were connected with basic products such as marbles and crayons which could not easily be regulated.[85] Predominant among the products involved in small parts injuries were coins. These data serve in part to highlight the fact that toys are only one element within a child's environment and a reduction or even an elimination of toy hazards may have very little influence on the overall risk level of that environment. A child that is prone to putting objects in his mouth will not be put off by a standard that prohibits toys from having separable components. Beds and sofas are dangerous products, more dangerous than most toys, for children who see their possibilities as a trampoline. This is not to suggest that the elimination of clearly hazardous toys from the market cannot provide significant benefits, but rather that the connection between safer toys and lower accident rates for children is likely to be less direct and less significant than we might expect or hope.

An important feature of the Canadian toy regulations is their preventative orientation; they do not prohibit specific toys but rather certain design features which involve a significant element of risk. While this approach has obvious advantages it requires the regulators to cast a wide net and this has implications for compliance costs and the extent of the enforcement function. Further complications arise from the fact that the design or construction feature causing concern frequently does not lend itself to the application of objective performance criteria. There is an important element of judgement involved in determing whether the metal and wooden edges on toys are sufficiently smooth. (Part II, items 12d & g). It is probably impossible to come up with a near-satisfactory definition or inventory of toys that "are or are likely to be used by a child of less than three years of age" (Part II, items 12c and r).[86]

The nature of the toy market is another factor complicating efforts to regulate this industry. There are approximately 10,000 - 15,000 different kinds of toys on the market, and about 1/3 of the total consists of new toys which come on the market on an annual basis. The vast range of products and the rapid changes that occur in product lines make the job of the product safety inspectors exceedingly difficult. It tends generally to be the case that enforcement of product safety regulations is most successful in stable industries characterized by a number of large firms and few imports. By contrast the Canadian Toy Manufacturer's Association has over 80 members, approximately half of whom are relatively small companies subject to very high rates of turnover; and imports are extremely important accounting for about 45 per cent of annual toy sales in Canada.

Self-regulation has played a significant role in the toy industry and has helped to ameliorate the problems related to the complexity of the enforcement function. Most of the toy regulations involve minimal compliance costs, and they represent

very basic safety requirements. For the individual producers, whose reputations can plummet dramatically with a few accidents related to poorly designed or constructed toys, the incentive for compliance is often substantial. This is clearly illustrated by some recent cases in which what were generally considered to be "freak accidents" prompted immediate large scale voluntary product recalls (i.e. Parker Brother's Riviton, Wham-O Manufacturing Co.'s Water Wiggle gardenhose).[87] The Canadian toy industry generally has a strong interest in gaining public confidence that its products are safe and designed with a sensitivity to the needs of its users. These factors provide an important offset to the problems of product safety inspection and enforcement, but they do not apply with equal strength to all safety standards, and to all segments of the industry. The self-interests of the toy manufacturer who has built a reputation for high quality products will diverge quite significantly from that of the producer whose competitive strength is related to the low cost of his merchandise. Foreign producers serving major markets with different regulatory requirements will be inclined to view Canadian toy standards quite differently from domestic producers who have a much narrower perspective.

The results of the department's inspection activities indicate the nature of the problem more precisely. In 1977 approximately 700 toys were tested by the Product Safety Branch and 46 per cent of these products were found to be in contravention of the Act.[88] This is a strongly biased sample since only those toys which are suspected of being hazardous are submitted for testing; nonetheless this exceedingly high rate of non-compliance suggests that the regulations are probably relatively ineffective in some areas. Available data on toy inspection over 1975 indicates that by far the highest rate of non-compliance (49.0%) related to the lack of warnings on flexible film bags (Part II, item 12a); the rate of failure was also high with respect to the regulation prohibiting separable components (item 12c), the regulation concerning the eye/nose

attachment on dolls and stuffed animals (item 13c), and the regulation governing the security of squeakers or reeds implanted within dolls or stuffed animals (item 13g).[89] A very small percentage of products failed because they contained toxic substances or excessive lead, or because sharp plastic edges could easily become exposed. It is particular significant that only about one-fifth of the products that were in non-compliance were manufactured in Canada. The main portion of the toys that were found to be in contravention of the Act were imported either by an agent or by a large Canadian retail outlet.

It is the general view of all who are acquainted with the industry - producers and consumers - that notwithstanding the problems of enforcement in some areas, the quality of toys and standards of toy safety have improved considerably over recent years.[90] As noted previously lacerations are by far the most common injury to children, and a significant portion of lacerations are due to toys. It's reasonable to expect that a reduction in toy risks would be reflected in a decline in toy-related lacerations. We attempted to test for this result by looking at the trend in hospital cases among two types of lacerations which are frequently a result of sharp edges and points on toys: eye wounds (ICDA 870) and hand wounds (ICDA 882). A basic model applied to data for the years 1960-76 produced the following results:

$$N = .26 - .004Yr - .04D$$
$$(23.63) \quad (-2.36) \quad (-2.42)$$
$$R^2 = .83$$

where N is the number of children under 4 hospitalized due to hand and eye wounds per 1000 population; Yr is the time trend variable; and D is the post-regulation dummy which is equal to one over the years 1971 to 1976. The estimated annual decline of 4 hospital cases per 100,000 children 0-4 is significant at the usual confidence levels, and consistent with expectations based

on the purported improvement in toy safety. It is reasonable to expect that if safer toys have been largely responsible for these results, hospital cases would not only decline in the post-regulation period but that the estimated impact would increase over time. This would be the implication of a continuing improvement in the quality of toy production and a steady decline in the stock of relatively hazardous toys in use. A slightly different specification yielded:

$$N = .26 - .003Yr - .003DYr$$
$$(23.63)\ (-1.91)\ \ (-2.85)$$
$$R^2 = .84$$

These results indicate that hospital cases have indeed declined at an increasing rate due to influences unique to the post-regulation period. While particular caution is necessary in interpreting these sets of results given that hospitalizations due to eye and hand wounds is obviously a highly imperfect proxy for lacerations attributable to toys, the estimations do provide some general support for the contention that toy safety has improved in the period since the toy regulations were initially issued.

In this example the dummy represents not only regulation, but a range of influences that have contributed to the reduction in toy hazards over the 1971 to 76 period. The limitations on the department's efforts to enforce compliance suggest that in the toy area in particular the safety improvements that have occurred have been the product of a number of influences. These include: increasing consumer awareness of, and concern about, the hazards in poorly designed and constructed toys; the growing recognition by producers that individually, and as a group, they have a considerable stake in reducing the risk associated with toys; changes in tort law and in particular the trend in both Canada and the U.S. towards the adoption of a principle of strict liability; and the development of more stringent toy standards

and proposed standards in other countries. While the toy regulations have undoubtedly contributed to the increased awareness of both consumers and producers, and the sanctions underlying the regulations have had some direct influence on the behaviour of manufacturers, it is impossible to isolate the effects of the regulation from that of the other factors that have been mentioned.

The requirements associated with most of the toy regulations would appear to involve modest compliance costs. A recent U.S. study of the economic impact of a regulation prohibiting sharp metal edges, for example, estimated that price increases in the affected industries would range from 0 in many industries to a high 5 per cent to 10 per cent in some industries;[91] this particular standard is probably fairly representative. A possibly more serious consequence of the early toy regulations was their potentially restrictive effects on imports. To the extent the early regulations were effective they would have eliminated a number of imported toy products from the market. In the case of a narrow group of products - a very small fraction of the several thousand toy products on the market - the resultant price increase could therefore have been well above the 10 per cent upper estimate. The effect on imports has become a less important factor as other countries, and especially the U.S. have extended the coverage of their toy regulations.

A balancing of the generally modest cost increases against the apparent decline in toy-related injuries, would suggest that the recent changes that have taken place in the design and construction of toys are highly desirable. While the changes cover a broad range of products and in some areas the benefits are undoubtedly negligible, this would appear to have been more offset by the gains arising from the elimination of some clearly unsafe toys from the market. What is particularly important in an industry subject to a large annual changeover in product line, is that the safety of the product has become an important

consideration in the minds of producers. It's not just that poor products have been removed from the market, but that the probability of hazardous toys appearing on the market has been considerably reduced. As noted, the changes that have occurred in the toy market are the product of a number of influences. The toy regulations have certainly contributed to the improvement in toy safety, but the net benefits of the regulation are only a fraction of the total gains associated with the reduction in toy-related accidents.

More generally, the data on injuries would suggest that the problem of reducing child accidents is a complex one, and that improvements in toys and other products, can only address a fraction of the accidents to which the under 15 population is subject. With respect to children under 4, who are particularly vulnerable to a diverse range of accidents in the home, the potential gains from a program designed to educate parents about possible hazards would appear considerable. The department has undertaken some educational activities of this nature but the commitment of resources has been extremely modest, and its unlikely that the potential net benefits in this area have been nearly realized.

(vi) Child Car Seats

The child car seat standards originally issued in 1972 and revised twice since then have been the most controversial of the department's product safety regulations. Critics have claimed that the rigid standards have contributed to substantially higher prices and the elimination from the market of many "good seats", which are available in the U.S. The lack of availability of a car seat for older children over 88 kg. has been attributed to the regulations. Concern has been expressed about test procedures and enforcement practices. And the Consumers Association of Canada has charged that the seat which has dominated the infant seat market accounting for over 80 per cent

of sales from 1975 to 1978 is unacceptable and has collapsed in a number of independent laboratory tests.[92] A task force was subsequently established by the Minister of Consumer and Corporate Affairs to look into these matters and related issues in the regulation of infant and child car seats.[93]

In the case of car seats as in the case of hockey helmets, the department is essentially establishing minimum quality standards for a safety or "life-saving" product. The analogy between the two products, however, is limited. The protective capacity of a hockey helmet is basically a function of the strength of its outer shell and quality of its energy absorbing liner. The variables that influence the performance of a car seat are more numerous and infinitely more complex. The testing required to replicate the performance of a car seat in crash conditions is costly to perform and provides at best a highly imperfect guide as to the required characteristics of a desirable car seat. It would also appear that consumers' needs and preferences (to the extent these can be defined) are subject to much less variance with respect to car seats than in the case of hockey helmets. The difficulty of providing consumers with objective, easily comprehensible information on car seats, along with the potentially dire consequences of substantial misinformation makes a labelling-cum-educational-type approach much less attractive in this area than in the case of hockey helmets. While these concerns suggest that the provision of information would in itself be inadequate, this can nonetheless be an important supplement to other approaches; in particular, the provision (or subsidization) of information can enhance the incentive for innovation by producers and help promote the increased use of car seats by consumers.

The regulation of child car seats comes under the Hazardous Products Act because this is a consumer product which is not covered by the Motor Vehicle Safety Act administered by Transport Canada. The latter legislation only governs the design and

construction of motor vehicles and original vehicle equipment, and it does not include any special protective requirements for infant or child passengers. The origin of the current regulations on car seats goes back to late 1970 when concern over the quality of seats on the market led to preliminary discussions involving CCA, the Consumers Association of Canada, Transport Canada, the Canadian Standard Association (CSA), provincial government representatives, and affected manufacturers. A CSA subcommittee was then set up in early 1971 to develop a safety standard for child restraints. In April 1972 while still awaiting the CSA report the Minister of Consumer and Corporate Affairs issued an interim standard based on static testing. This regulation eliminated many of the poorly designed hook-over seats from the market and required, among other things, that car seats be able to withstand a certain minimum pull pressure. About two years later, in March 1974, the Minister announced proposals to strengthen the regulations in two stages. The first phase, which became effective later in the same year, incorporated most of the preliminary recommendations of the CSA subcommittee along with an additional restriction on the allowable movement of the test body used in static testing. The second phase, which did not become effective until November 1975, contained the long-awaited requirements based on dynamic testing. With a view to reducing the likelihood that a child's head could come in contact with the dashboard or other parts of a vehicle a limit of 18 inches was imposed on the frontal movement of the head of a test dummy in a test that stimulates head on crash condition at 30 m.p.h. Additional limits were imposed on allowable head movement in lateral (15" limit) and rear (27" upward head movement limit) impact tests. These limitations were far more rigid than those recommended by the CSA subcommittee. In his original announcement the Minister acknowledged that parts of the proposed regulation were "somewhat ahead of the current state of technology," but the 18 month lead time before the regulation came into effect was viewed as sufficient to allow companies to develop a car seat that would comply with Phase III requirements.

The head excursion limits established for dynamic testing have been the subject of substantial criticism. To meet Canadian test requirements a car seat must have tether straps which can be bolted into the rear parcel shelf. This involves an additional element of cost and inconvenience and it is a requirement which is particularly susceptible to misuse by consumers. The Phase III requirements, which were (and are) considerably more rigid than U.S. standards, have also substantially reduced the variety of car seats that can be imported and sold in Canada. CCA officials have claimed that these concerns are more than offset by the importance of having a restraint system which takes account of interior vehicle dimensions and thereby reduces the probability of head injuries to children using car seats.[94] Some critics, however, have challenged CCA's interpretation of the available data on vehicle survival space. They have also raised concerns that deacceleration of the infant over the distances imposed by the regulation could result in excessive stress and in itself lead to significant injury including possible spinal cord damage.[95]

While the technical information required to evaluate the Phase III requirements is exceedingly complex, the basic regulatory problem is not unlike that encountered in other product areas where the appropriate level for a standard is to be determined. The general answer in all cases is that a standard should be established with a view to minimizing the sum of accident costs and accident prevention costs; and this requires the level of a standard to be increased as long as the value of the resources going towards the production of safety is less than the value of the reduction in risk which results. The merits of adopting the rigid head excursion requirement therefore, depends on the marginal costs and benefits as opposed to a somewhat less restrictive alternative which does not require the use of a tether strap Marginal costs in this case would include: the increase in manufacturing costs; costs of installing the tether straps plus the costs of any increased inconvenience, x N, the

number of consumers who use the straps; the increase in risk of infant injury due to the shorter stopping distance x the average expected severity of injury x N; and any temporary or longer-term decline in the usage of car seats due to the effect of the higher standard on price, availability, convenience, or innovation x the increased risk of injury associated with likely alternatives such as regular seat belts. Marginal benefits would consist of: the potential number of injuries that could be prevented by the use of the more restrictive standard x the average severity of these injuries x N; minus any increase in the risk of injury due to the non-use of tether straps as opposed to the proper use of the less restrictive alternative x the average severity of these injuries x the number of car seats sold minus N.

There are clearly big gaps in our understanding of both the technical and behavioural factors that influence the costs and benefits of child safety restraints. On the technical side, for example, it would appear that the disagreement among experts over the risk of spinal or abdominal injury resulting from the more restrictive head excursion limit, is due to the fact that observed relationships on this aspect reflect the influence of a number of variables, only some of which have been identified and are well understood. On the behavioural side there is much that is unclear about the use and misuse of child car seats. A survey undertaken for CCA suggests a very high proportion of parents use child car seats - particularly by comparision to the U.S. - and that most install the tether strap and use the seat correctly. However studies of seat belt use have indicated that surveys in which individuals are asked to report on their usage tend to be grossly misleading indicators of actual usage.[96] If there is a substantial gap between the actual and potential usage of child car seats and a standard has any influence on the size of this gap this could well be the most important consideration. Accident studies in the U.S. suggest that very few deaths have occurred to infants using car seats. Officials in the U.S. have interpreted these data as suggesting the need for relatively

liberal standards and a "positive" approach to regulation which is aimed primarily at promoting the development and use of child car seats.

Notwithstanding the unanswered questions that remain, Canada's experience regulating child car seats highlights a number of general issues. First, it illustrates the need for a prior socio-economic analysis of important product safety regulations of this nature. In the case of car seats the likely results of this exercise would be a range of estimates of the cost-effectiveness of alternative standards based on various assumptions about the possible influence of those variables which are incompletely understood.[97] While cost-effectiveness analysis cannot provide precise answers on an issue such as car seat standards, it fulfills an important function by requiring regulatory authorities to examine the range of factors influencing the desirability of a standard and forcing them to make their views about the relevant relationships explicit. It would appear, for example, from the submission of the Product Safety Division to the Minister's Task Force on car seats that some of the factors that enter into a determination of the relative merits of alternative standards were given insufficient attention in the development of the Phase III standards. Any direct and indirect influence of the standard or the standard- setting process on car seat usage deserves careful consideration - more so than it was apparently given - since even a small negative response could substantially affect the overall cost-benefit calculus. There is also a need to take account of the fact that tether strap systems are susceptible to misuse. The Product Safety Branch has indicated a reluctance to undertake misuse testing,[98] but where there is an obvious and potentially important form of misuse, a standard, which includes minimum performance criteria under conditions of misuse can provide substantially higher net benefits. These aspects would be likely to have received greater attention had there been a requirement in 1974 for a socio-economic analysis of important proposed regulations.

A second issue to emerge is the importance for test procedures used to determine compliance to be very precisely defined and very clearly specified within the regulations. A great deal of uncertainty and confusion concerning the acceptability of various car seats arose due to the fact that independent laboratories using the test criteria in the regulations were coming up with different results. One test result in fact showed all car seats on the market to be unacceptable by current standards. This sort of ambiguity can discourage the development and marketing of products for the Canadian market. Perhaps more serious, it can undermine public confidence in the reliability of those products which are available. While there are legitimate tradeoffs between the need for realism and the need for repeatibility in testing procedures it is generally agreed that the prescribed test for car seats strayed too far from the latter objective. The Product Safety Division has acknowledged the general problems in this area and made some recommendations with a view to more adequately defining test procedures.

The third, general issue which comes out of the experience with car seat regulations is the desirability of a more open approach which provides for a greater public availability of information and increased public input into the development of important regulations. The recent task force inquiry into car seats made public a great deal of evidence on this regulatory issue, and in the process helped to highlight a number of more questionable aspects in the current approach.[99] Much of this evidence could have surfaced prior to the establishment of the car seat regulations if there was a system in place requiring the government's analysis of the proposed standard and comments on this analysis to be made available for public scrunity. When in 1974 the Minister of Consumer and Corporate Affairs rejected the recommendations of the CSA subcommittee on child car seats, there was little opportunity for the public to appraise the analysis and supporting evidence on the different sides of this issue. The

system of prior review which was recently introduced within the federal government, and the Prior Assessment System recommended in the Council's interim report on regulation represent two attempts to respond to concerns in this area. We will return to this issue in the final section of the study.

(vii) 1.5 Litre Soft Drink Bottles

The regulation issued August 28, 1979 banning commerical sales of carbonated beverages in 1.5 litre glass containers stands out in a number of respects from the department's other product safety regulations. One striking aspect is the size of the affected sector. Most of the items covered by the Act, and especially the items prohibited under Part I of the Schedule, relate to relatively small industries in terms of output, or affect narrow, quite specialized industry segments. The Canadian soft drink bottling industry, by contrast generates about $1 billion a year in revenue, and the 1.5 litre bottle accounts for close to 20 per cent of total production and more than 10 per cent of total sales revenue. Another unusual feature is the abruptness with which this regulation was introduced. It was only about three months from the time a Toronto engineer initially became alerted to the problem until the date the regulation became effective. While the department has moved swiftly in the past to clear the market of highly dangerous substances or products, the more usual course - and the much preferred course especially where domestic producers are affected - is to provide manufacturers with a reasonable time period to adjust to the new requirements. Even where regulations are issued to become effective immediately it is generally the case that manufacturers have been forewarned for some time - a lag of over a year is not unusual - that investigations were underway and that regulatory action was likely. A third notable aspect of the bottle regulations was their temporary or interim nature. Again this is not the first time interim measures have been introduced (the 1972 child car seat standards were interim), but

it takes exceptional circumstances to prompt the department to act prior to undertaking the necessary research and regulatory development work. There is certainly a recognition by department officials that interim measures prolong the uncertainty and exacerbate the adjustment problems which result from regulatory intervention.

These aspects have made the ban on 1.5 litre bottles exceptionally costly in comparison to most regulatory activities in the product safety area. The most easily quantifiable element of economic waste arises in connection with the resources which were required by the regulation to be kept idle. The Canadian Soft Drink Association has $20.5 million invested in 1.5 litre bottles and another $26.3 million invested in 1.5 litre shells or carrying cases.[100] Assuming the average bottle has completed half its useful life, the current value of these assets is in the order of $36.5 million. At an interest rate of 15 per cent the value of the foregone services of these resources over a one year period is $5.5 million. Other costs include any resulting product wastage, the loss to consumers from the elimination of the 1.5 litre container, the loss to consumers and producers arising from any decline in overall soft drink sales, and the costs of production inefficiencies attributable to the regulation. It's reasonable to expect that the elimination of the 1.5 litre bottle will result in an increase in the sale of carbonated beverages in other sized containers. The 750 ml bottle is a reasonable substitute though the beverage tends to be slightly more costly (about .5 cents per fluid ounce) in this smaller container. The industry has maintained, that the initial shortage of 750 ml containers prevented an anticipated growth in sales, but this is not apparent from the available data. To the extent that potential sales are reduced there will result a loss both to consumers (in terms of foregone consumer surplus) and to producers (in terms of foregone profits). The modification of the production process to accommodate a change from the handling of 1.5 litre containers to an increased use of 750 ml containers

will, at the same time, influence the costs of production. A filling line which is used for the bottling of 1.5 litre containers can be adapted for the 750 ml container but because of its relatively slow pace the 1.5 litre line is highly inefficient in filling the smaller bottles. It has been estimated that the resulting loss in efficiency would be in the range of 10% to 20% and the corresponding increase in production costs over the year would be about $4 million.[101]

The regulation has necessitated other more severe adjustments - including apparently some employee layoffs - by the bottlers who specialize in the wide-mouthed 1.5 litre container (the type used by Coca-Cola), some of whom had 75 per cent or more of their production affected by the ban.[102] If total sales have not been significantly affected, however, and productivity has declined in the industry, it is reasonable to expect that employment losses among some plants would be more than offset by gains in employment and hours of work in other plants. Since the regulation is an interim measure it's also necessary to consider the possibility that some of the production changes underway may be inconsistent with the industry's long-term requirements. For example, the regulation has influenced the industry's relative investment in different sized containers and it is quite likely that when new regulatory requirements are introduced bottlers will want to again readjust their holdings of various containers. Among the other consequences of the regulation was its effect on the environmental programs of provincial governments. The regulation was of particular concern to the government of Ontario in this respect which was forced as a result of the ban to modify the terms of its voluntary agreement with industry for a phased reduction in the proportion of non-refillable bottles sold in the province.[103]

Given the lack of data on product-related accidents in Canada the best one can hope to come up with in measuring

benefits is some indication of the general magnitude of the injuries involving 1.5 litre containers. Estimates based on NEISS data put the number of accidents in the U.S. due to pressurized glass soft drink bottles at just over 86,000 in 1975. This works out to 3.9 accidents per million fillings. The estimated accident rate is an overall average for returnable and non-returnable containers covering all size categories. It is not clear that there is a significant difference in accident rates associated with returnable and non-returnables, but it is evident that the larger bottles containing greater amounts of compressed energy involve a higher element of risk than the smaller bottles.[104] In the 3 months from June to August 1979, CCA received 132 reports of incidents involving soft drink containers, and 30 per cent of those were associated with the 1.5 litre bottle. Based on the relative number of 1.5 litre containers in circulation this suggests the larger containers were subject to accidents at about three times the average rate. Since media coverage and public concern was directed at the 1.5 litre container and this undoubtedly had some influence on accident reports, this is most appropriately viewed as an upper indication of the possible difference in accident rates between the 1.5 litre and other bottles.

In calculating the benefits of the regulation over a one year period it's necessary to take account of the fact that any decline in accidents due to the elimination of the 1.5 litre bottle will be at least partly offset by the increase in accidents due to the greater use of other glass containers. If, for example, the consumption of soft drinks stays the same over the year with the 750 ml container substituting for the 1.5 litre container, and the rate of accidents associated with the smaller container is exactly half that for the 1.5 litre container, then the total number of accidents will be unaffected by the ban. In examining costs we did not attempt to quantify the possible effects of the ban on industry sales. We will retain the implicit assumption that the 750 ml. container successfully

gained hold of the market relinquished by the 1.5 litre bottle and there was no signifant loss in sales. We will also assume that the accident rate involving 1.5 litre bottles is three times the rate for other containers including the 750 ml. containers. Employing these assumptions and the U.S. estimate of an overall accident rate of 3.9 per million fillings suggests that over one year the ban on 1.5 litre bottles may eliminate 443 accidents.

Comparing the estimated benefits with the $9.5 million in costs that have been identified, the cost of the regulation over one year works out to in excess of $21,000 per accident prevented. This is a very conservative estimate of costs per accident averted in that it excludes some possibly significant elements of cost associated with the regulation, and it is based on reports which would tend to exaggerate the higher accident rate involving 1.5 litre containers. As we noted, if it is more reasonable to assume that the accident rate for the 1.5 litre bottle is only twice that for the 750 ml. bottle, then - retaining all the previous assumptions - there would be no accidents prevented by the regulations and no benefits to offset the $10 million in costs. The vast majority of injuries involving soft drink bottles are minor cuts. U.S. data suggest that over 30 per cent of the injuries are hand and finger cuts.[105] Eye injuries, which are the major source of concern, occur very infrequently. Product liability claims for eye injuries in the U.S. in 1975 - which may be a reasonable indicator of the number of serious eye injuries due to soft drink bottles - were about 5 per billion fillings.[106] Even if eye injuries in Canada due to the 1.5 litre bottle were ten times higher (i.e. 5 per 100 million fillings), it would require an exceptionally high valuation to be put on these and other injuries (i.e. $1 million per eye injury and almost $9,000 per each accident of another kind) just to balance the costs of the production inefficiencies and the resource waste resulting from the ban. While there are legitimate concerns about the accidents associated with soft drink bottles the costs of the 1.5 litre ban

are clearly excessive. The resources that have gone into complying with this regulation could undoubtedly have prevented many more accidents, and much more severe accidents, if they had been more effectively employed.

These calculations do not indicate that a performance standard for 1.5 litre bottles and other containers is undesirable. The department is currently attempting to develop a standard which would eliminate the most serious accidents associated with soft drink containers.[107] The performance criteria that emerge, which could lead to the plastic coating of bottles, will involve a different set of considerations and require quite a different analysis. What the general data on costs and benefits does suggest is that the urgent measures taken in this area, in the summer of 1979, were not justified - that the hazards associated with 1.5 litre containers did not warrant the exceptional treatment they were given.

From this perspective, the ban on 1.5 litre containers is an interesting example of a regulatory response to a perceived emergency. It was noted previously that people tend generally to ignore small probability events. This is much less likely to be the case, however, when personal examples, or widespread publicity make the consequences and possibility of a hazard salient. Studies have indicated, for example, that individuals who know someone whose health has been adversely affected by smoking are three times as likely as other smokers to give up cigarettes.[108] It has been noted that interest in breast cancer checkups soared following the extensive mass media publicity of Betty Ford and Happy Rockfeller's mastectomies. In these cases information not only increased individuals' awareness of risks, but it influenced - and probably very substantially - their subjective probability estimates of the relevant dangers.

In an important article Eisner and Strotz address themselves to the question of why people continue to buy air accident

insurance when, on the basis of objective statistics on death rates, ordinary life insurance is considerably cheaper.[109] They suggest the reason is partly that the extensive publicity plane accidents receive have led individuals to believe such crashes are relatively frequent. The ban on 1.5 litre containers was a form of regulatory insurance which can similarly be traced to extensive publicity of the associated dangers. In the period from May 1979 when Professor Barham discovered that the 1.5 litre bottle is likely to burst when tipped over to the end of August when the ban was issued the risks related to the large soft drink containers were given intense media coverage.[110] Television and newspaper reports highlighted the dangers arising from "torpedo-shaped" bottles which could "explode", and graphically portrayed the details of a few particularly frightening incidents. Within a very short span of time a danger of which most people were unaware or which they had relegated to near the end of a very long list of considerations, was raised to the status of a major concern and a significant federal policy issue. Individuals who looked at Canadian newspapers or television over the summer of 1979, could not but help have an inflated view of the probability and severity of accidents associated with soft drink bottles. As a result, and similar to the situation with respect to flight insurance, individuals were willing to pay an exceedingly high price for protection against the perceived hazards. The regulation issued August 1979 was a response to these influences and the resulting public demand for immediate action to be taken to deal with the danger of exploding soft drink bottles.

(4) Conclusion

An analysis of available accident data and selective regulations suggests that the Hazardous Products Act has been effective in reducing the number and severity of accidents involving consumer products. While a number of very serious product hazards have been effectively addressed, however, serious questions arise with respect to some of the department's

activities, including some of its more costly regulatory initiatives (i.e., child car seats and 1.5 litre bottles). The case studies indicate that the most desirable form of intervention has not always been chosen, and they raise questions about the manner in which the department targets its activities on particular product risks. The general view that emerges is that product safety regulation is yielding significant benefits, but that opportunities for the efficient production of safety have not been nearly realized. The evidence suggests, in other words, that consumer risks could be reduced much more substantially by an improved allocation of the existing resources devoted to product safety. With a view to gaining a better understanding of these results, the next section looks at some general characteristics of decision-making related to the administration and enforcement of the Hazardous Products Act.

C) ADMINISTRATION AND ENFORCEMENT

1 The Identification of Product Hazards

The lack of a systematic process for the identification of important product hazards limits the ability of Canadian authorities to target regulatory activities towards the areas of greatest need. Information on product risks is accumulated from a variety of sources, including consumer complaints, coroner's reports, the studies of provincial governments or other federal departments, and published tabulations from the U.S. injury surveillance system. While some accident data is available in Canada - such as the fire statistics published by provincial governments and the poisonings data collected by Health and Welfare - these have been of limited use, and they have not significantly diminished the department's reliance on individual case information. There is a clear danger that the selective information on product risks flowing into the department will provide a misleading indication of the extent and nature of the hazards associated with the use of consumer products.

A related concern is the lack of attempt by the department to priorize its activities with a view to the degree and consequences of market failure in particular product areas. There is a general recognition of the need to focus government intervention of what we've termed "involuntary risks", although this term is defined rather broadly and serious questions can be raised about some of the items included under this label (i.e. safety glass, and matches). It does not appear, however, that there has been any special emphasis given to those areas where information deficiencies are likely to be most pronounced. One might expect, for example, that there would be much more attention given to long-run health hazards, which is the problem area where information is most lacking and with which the market and the legal system are probably least able to deal. CCA has largely been dependent on the advice and direction provided by the Department of Health and Welfare on health issues. A lack of resources and expertise has prevented the Product Safety Branch from pursuing potentially important initiatives such as, for example, the large-scale investigation recently launched by the CPSC into asbestos hazards in consumer products.[111]

The Canadian approach can be contrasted with the comprehensive system for recording product accidents in the U.S. Data on product-related injuries from 72 statistically selected hospital emergency rooms throughout the U.S. are fed into a central computerized data bank, known as the National Electronic Injury Surveillance System (NEISS). This is supplemented by more in-depth studies of a sample of reported accidents. In ordering priorities, the CPSC relies heavily on a hazard index that is derived by combining the accident data from NEISS with weights intended to reflect the relative severity of various kinds of injury. Notwithstanding the merits of the accident reporting system this approach has been recognized to have a number of deficiencies as a guide to where resources should be targeted.[112] The main problems stem from: the arbitrary nature of the weights; the failure of the index to adjust for

product usage (so that products which have a low accident rate but are infrequently used would have an unrealistically high value on the index); the total reliance on emergency room data which understates deaths, ignores health problems and gives no consideration to property damage; and the inability of the data to indicate those hazards which are most amenable to a regulatory solution. In addition, many of the product risks which rank high on the hazard index are well understood and voluntarily assumed by consumers.

The criticisms of the U.S. hazard index are based on the general view that regulatory activity should concentrate on these areas where potential benefits are greatest relative to costs. An accident reporting system cannot, of course, make this determination. But an information system which includes reference to factors such as the frequency with which a product is used and which distinguishes between known and hidden risks, can help signal the product risks which may warrant action and which therefore deserve further analysis. The absence of an information system which can fulfill this "signalling" role is a major deficiency of the Canadian system of product safety regulation.

2 The Development of Product Regulations

The process of developing regulatory standards has been characterized by extensive consultation with industry representatives and experts in relevant problem areas, and a heavy emphasis on problems of a technical and engineering nature.[113] When there is a decision to begin work on a standard, a committee will be established consisting of individuals from major manufacturing and retail firms, officials from other governmental departments, a member of the relevant standards organization, and sometimes a consumer representative. An individual from the Product Safety Division will chair the committee and will co-ordinate the discussions and the development work, including the laboratory research, that goes on within the branch. The process

of consultation and the favourable relations the branch has established with most industry groups has facilitated the development and implementation of product standards. Information provided by industry representatives has assisted officials in determining the size of the market for very specific types of products. (This involves production data which is generally treated as confidential by Statistics Canada). The participation by industry representatives has also assisted the department in determining the feasibility of proposed changes in product design, the adequacy of proposed test procedures, and the appropriate timing (considering inventories and production lags) for the implementation of new product regulations.

The process of analysis and consultation generally tends to highlight a number of the issues which are relevant to a determination of regulatory costs and impacts, but prior to the implementation of recent federal requirements for a socio-economic impact study of major new regulations there had not been any systematic attempt to analyse proposed initiatives. For the regulations examined in the earlier section it would appear that officials generally had a clear understanding of the nature of the process by which the hazard was generated; they seldom had a clear notion of the number of accidents that were likely to be prevented by a specific change in product design and construction. Compliance costs sometimes entered explicitly into the committee discussions, but generally they did not. There was often discussions, however, about the magnitude of the required design change and the degree of adjustment a particular standard would entail. Individual manufacturers were particularly concerned that any required production change would not leave them in a less favourable position relative to domestic competitors and importers.[114] At the same time, product changes that were likely to significantly affect the utility and appeal of a product and adversely affect all producers tended to be subjected to critical analysis and review. There was also significant attention given to the proposed timing of new regulations and to

the losses that would be incurred if manufacturers and retailers were not allowed to dispose of their existing inventories.

While consumer groups tend to be underrepresented in the committee system, department officials strongly represent the consumer interest in safety, and to the extent that a bias exists in the decision-making process, it tends to be in the direction of increased product safety. Grabowski and Vernon have claimed that the CPSC is subject to a "safety imperative" in that its decisions are heavily influenced by potential benefits and much less so, if at all, by estimated costs.[115] One can find similar evidence of a "safety imperative" in the decisions of Canadian officials, but the resulting bias is not a consistent and systematic element in the decision-making process. In dealing, for example, with hazards which entail potentially serious consequences and which affect young children, officials have rejected any consideration of costs. The entire emphasis has been on meeting the perceived need for an immediate and effective response. When dealing with other hazards, however, where the risk may appear less direct and/or the consequences of the mishap less serious, the department has been sensitive to the cost implications of its decisions and amenable to suggestions which would reduce the magnitude of the required design change and/or the costs of adjustment. The department has also been conscious of the high potential costs associated with the use of a product ban, and this instrument is generally employed very carefully and selectively, contrary to the situation if risk reduction was the sole objective. In the case of regulations, such as those pertaining to hazardous substances and flammable fabrics, the department has clearly shown a sensitivity to the magnitude and extent of the adjustments which would be necessitated by more stringent regulations.[116]

3 Compliance and Enforcement

The limited resources of the department relative to the scope of the enforcement function has precluded vigorous enforcement of the Act and the full pursuit of available legal remedies. Where violations of the Act are discovered the department prefers to proceed by gaining the co-operation of retailers and manufacturers in removing the product from the market. The product safety inspectors have the power to seize goods which are suspected to be in violation of the Act, but this power has been exercised much less frequently in recent years. There have been very few attempts to prosecute suspected violators; since its inception there have only been nine convictions under the Act (along with one dismissal and four withdrawals).[117] Part of the problem in this area relates to the nature of the legislation the department is administering, and the limited options it provides for penalizing violators. If the department wants to take action it must take criminal action and meet the rigid standards of proof required to gain a conviction.

While the very low probability that violations will result in legal action combined with the low penalties upon convinction reduce the deterrent effect of the Act, manufacturers are sensitive to the negative publicity which could result from product recalls or seizures. For most major domestic producers the expected gains that would arise from not complying with a product standard would be unlikely to match the expected direct and indirect costs of a product recall. Enforcement problems have been most acute for imported products, and particularly for products subject to more rigid safety standards in Canada than the U.S. There is also a significant difference in the compliance rate of large and small domestic producers. A study by the U.S. CPSC of compliance with its mattress flammability and children's sleepwear standards have highlighted this aspect, indicating the much greater responsiveness of larger producers to a change in product standards.[118] In the case of lower

quality domestic and imported products, where there is little consumer brand awareness, the negative publicity associated with product seizure or recall is much less of a deterrent. The emphasis of the department on performance standards, while beneficial in a number of respects has increased the magnitude and costs of the enforcement function. In some cases enforcement problems have been further exaccerbated by a failure to adequately define the hazard and/or required test procedure. The child car seat regulations are the notable (though not the only) example of the latter problem.

The department has attempted to concentrate its inspection activities on sectors which have the poorest record of compliance, and also to give special attention to products such as cribs and rattles where even a small degree of non-compliance is viewed as unacceptable. This is not the same as a strategy which attempts to maximize the gain from enforcement activities, and which would be based both on the net benefits from compliance in various areas and the expected increase in compliance from a given commitment of resources; however, given the lack of information on the relative benefits and costs associated with various regulations the emphasis on problem areas is a reasonable one. The relatively limited resources of the department, though, has restricted the range of enforcement activities that can be undertaken. It is important generally that inspection activities incorporate an important element of random checking so that producers and importers cannot predict these activities and adapt to them. With the limited field staff devoted to product safety activities it becomes difficult to make an onslaught on problem areas and still maintain a significant capacity for randomized inspection.

CONCLUSIONS AND RECOMMENDATIONS

A) Conclusions

General considerations raised in the first part of this paper indicate that there is scope for government activities to address consumer problems in acquiring and processing information on product hazards. Government intervention can provide important benefits where there are information gaps causing consumers to assume significantly greater risks than they would knowingly accept. At the same time, however, government regulation can have a highly restrictive effect on consumer choice and can also have a significant impact on market structure and the degree of competition. A poorly designed standard could be counterproductive, leading consumers to assume increased risks, or to shift their purchases to equally hazardous unregulated products. These aspects highlight the need for a broad socio-economic analysis of proposed initiatives, which includes an examination of their possible indirect impacts, and a consideration of the alternative policy options which are available to respond to the problems in specific product markets.

The analysis in the second part of the paper provided some indication of the benefits that have been derived from product safety regulation in Canada. When the Hazardous Products Act was passed in 1969 it filled a major gap in the legislative framework that had been established to address failings of the market with particularly serious economic and social consequences. A number of product safety regulations respond to very major problems which other mechanisms, such as the product liability system, cannot adequately address. Product safety initiatives such as those pertaining to hazardous substances and cribs indicate the substantial gains that can be realized where the basic problem is amenable to a regulatory solution and appropriate action is taken.

The analysis also suggests, however, that opportunities for the reduction of consumer risks from a given commitment of resources have not been fully realized. The department has not attempted to systematically analyse alternative options so as to target resources to areas offering the greatest net benefit. Indeed the process by which hazards are identified raises the possibility that there may be major opportunities for the reduction of health and safety risks that have not been grasped. The case studies suggest that the department is putting too much emphasis on standards in some areas where a less restrictive approach involving the dissemination of information would be likely to yield greater returns. In some cases stringent standards have been established with an inadequate consideration of their costs and other effects, some of which in turn may indirectly influence the achievement of safety objectives. And enforcement of the Act has suffered from the minimal commitment of resources to inspection activities, and the inability to direct enforcement efforts to areas with the greatest potential payoff.

B) RECOMMENDATIONS

1. There is a need for an information system which can contribute to a more systematic process for the identification of important product risks and the establishment of regulatory priorities. The purpose of such a system would be to integrate and organize available information on product risks so as to produce a manageable list of candidates for further research and analysis. A successful information system would indicate the number and severity of accidents associated with various products; it would include information on health risks; it would indicate which risks are likely to be involuntary; and it would contain information on product usage and thereby the degree of exposure to various risks. While an information system does not eliminate the need for economic analysis, it can help to ensure that the department is alerted to the

existence of serious product hazards and that it focuses its analysis and research on those product risks, which are the most promising candidates for government intervention.

2. A data base which provides information on the number and severity of accidents associated with various consumer products would be an important component of the information system described in Recommendation 1. Officials in the Product Safety Division have long been concerned about the absence of accident data in Canada and they have advocated the establishment of a surveillance system which would regularly report on emergency treatments in a random sample of hospitals.[119] The alternative would be to place a greater reliance on foreign data sources, including particularly NEISS data from the U.S., and to attempt to suitably adjust these results for differences in the sales of various products and various makes and models of products in Canadian and foreign markets. The feasibility and costs of establishing a limited accident reporting system which could support the activities of the Product Safety Branch as well as other government agencies concerned with safety issues (such as Transport Canada, Health and Welfare Canada, and the provincial highway departments) warrants further examination. Such a review should attempt to compare the costs of establishing an accident reporting system with the benefits in terms of the increased precision that would come from using Canadian as opposed to adjusted foreign data.

3. An accident reporting system cannot detect the more subtle and complex product hazards which are not treated in hospital emergency rooms. Health hazards are less important in product safety regulation than in the regulation of food and drugs, occupational health and safety and the environment. Some of the consumer products that do raise concerns of this nature, such as microwave ovens and pesticides, are outside of CCA's mandate. Nonetheless, the

inability of the market to respond to these potentially severe types of hazards makes this general area an exceedingly important one for government attention. In the product safety area, there is a need for an inventory of the products containing substances that are known or suspected health hazards. Risks associated with various substances must be evaluated and reassessed over time as exposure levels change or as our understanding about the nature of the hazard changes. While some (or all) of these activities can probably be most efficiently performed by the Department of Health and Welfare, it is important that the results of this type of review be incorporated in CCA's system for evaluating and comparing various candidates for product regulation.

4. The case studies indicated that substantial gains could be realized in terms of improved resource allocation by a more systematic analysis of proposed regulations. Economic analysis can make a major contribution to the determination of where government activity ought to be targeted, which strategy of intervention should be employed, and what level of regulatory control is most appropriate. The system of prior review recently introduced by the federal government requires that departments undertake a socio-economic impact analysis (SEIA) and allow for public participation in the development of all major new health, safety and fairness (HSF) regulations. As noted previously, very few of the regulations under the Hazardous Product Act would be "major" in the sense that it is defined for this program. And indeed it would probably be undesirable to extend the formal requirements of this program to the majority of product safety regulations. However, concerns about the delays and impediments which could arise from an extension of procedural requirements do not in any way weaken the case for an economic analysis of proposed regulations. In many cases even a very brief examination of costs and benefits - involving a small fraction of the resources that would

normally go into the laboratory analysis of product defects - could yield important insights into the relative merits of a proposed course of action. Economic studies should be undertaken for all initiatives that are being seriously considered and the results of such studies should be a major input in the department's decision-making process.

5. The requirements of the new federal program for an increased and more formal process of consultation raise a number of quite separate considerations. The experience of the CPSC in the U.S. indicates how lengthy and involved procedural requirements can add to administrative costs and impede the ability of regulators to respond promptly and flexibly to new product hazards. Even the much more limited requirements associated with the Canadian SEIA program can be inordinately cumbersome and costly in the case of relatively minor regulations. Industry co-operation has assisted the department in the development and implementation of product safety standards, and this co-operation could be jeopardized by procedural reforms which make the regulatory development process more politicized. It is necessary to balance these considerations against concerns about the lack of openness of the regulatory process and the insufficient opportunity it affords for public participation. The discussion of the car seat regulation indicated the nature of the benefits that one might expect from a process which provided for increased public scrutiny of regulatory decisions. The establishment of a cost threshold which excludes relatively minor regulations from the procedural requirements of the review program (as is now the case with the federal SEIA program) seems a reasonable approach to balancing the need for public participation against the need for speed and flexibility. However, experiences in the product safety area suggest that the criteria for formal review should not be strictly cost-based. Many regulations with costs below the threshold level established for the SEIA program involve issues which

are highly controversial and of major concern to many groups. This may be the case, for example, because the impact of the regulation is especially burdensome to a particular group, or because the regulation concerns a critical hazard on which technical opinion is sharply divided. The regulatory review program should provide a central co-ordinating group with the authority to direct government agencies to enter into the formal process of analysis and consultation where proposed initiatives (regardless of their cost) are likely to be a major source of controversy and concern.

6. Consideration should be given to various means for facilitating the enforcement of product safety regulations. In this regard two provisions within the the U.S. Consumer Product Safety Act merit examination. Section 15 of this Act makes it an offence for manufacturers, distributers and retailers not to report a safety hazard or suspected hazard to the Commission immediately. Some years ago David Pittle, a member of the Product Safety Commission called this section "the sleeper of the year", noting:

> To date there have been roughly 200 of these notifications involving everything from refrigerators to televisions to tractors to lawnmowers. Manufacturers, distributors, and retailers are calling us up, for example, saying, "I am selling a home jack stand that you put a car on and it could collapse." That is good information to have before someone gets under the car. Today consumers are being warned in advance.[120]

Another potentially significant provision of the U.S. Act empowers the CPSC to require that test results and other material relevant to the enforcement of the Act be maintained by firms and made available as requested. Under the Hazardous Products Act (section 10) the Minister has the narrower and more restrictive power to request details on the chemical composition of a product or other information, where he "has reason to believe that a product or substance - (is

one that) - may be added to Part I or Part II of the schedule...". CCA has been reluctant to engage in pre-marketing clearance, because of the resources this would absorb and the possible conflict that could arise between clearance and enforcement functions. These concerns, however, should not preclude attempts by the department to obtain increased information on the safety of new products. A provision similar to the one in the U.S. Act could be used to require manufacturers and independent testing agencies to file test results and other information on new products with the department and it could provide much needed support for the inspection and enforcement functions.

7. Product regulation is only one of a number of possible ways by which to respond to the risks associated with consumer products, and in many cases it is not the most efficient response. While, for example, changes in the child car seat standard may afford the infant passenger greater protection, it is generally acknowledged that one of the most important requirements in this area is provincial legislation to make the use of restraints mandatory for children under five (at present, this requirement only exists in Saskatchewan). An extension of the department's research capacity would enable it to develop a more complete understanding of the significance of various factors underlying product accidents and the relevant efficiency of the wide range of possible solutions that are available. A research facility which focussed on product accidents in this very broad context could support a gradual expansion of the department's role from the "regulation of consumer products" to the "promotion of consumer safety". In the latter capacity the department would extend its activities to encouraging changes in behaviour and in the rules, regulations and practices of various public and private groups and institutions. While many of the required remedies to consumer safety problems are outside the authority provided by the Hazardous Products Act,

the department could help to facilitate the required changes by making information available, consulting with groups and other government departments, offering research assistance, helping to co-ordinate various activities and perhaps subsidizing particular safety initiatives.

8. The regulation of hazardous products, occupational health and safety, food and drugs, the environment, and motor vehicle safety are all directed towards the general objective of reducing risks to which the population is exposed. The notion that there are broad choices to be made in deciding how best to allocate the economy's resources towards risk reduction has a number of implications. To facilitate comparisons it is important that a similar methodology and a common framework of basic assumptions be employed in analyzing the costs and impacts of government initiatives in these diverse policy areas.[121] It is necessary in particular that there be a similar approach to valuing those "goods" which are not traded in the market, or for which market prices are difficult to identify. This does not necessarily mean that the value attached, for example, to individual lives, or to pain and suffering need be identical in all policy areas; indeed there is some evidence suggesting that individuals themselves value a reduction in risk differently in different circumstances.[122] However, it does suggest that valuations placed on basically similar benefits in different policy areas should bear a reasonable relationship to one another. The focus on risk reduction also suggests the desirability of having a central advisory or co-ordinating group develop an overview of the net benefits forthcoming from different policy areas. It could conceivably be the case, for example, that resources devoted to proposed product safety initiatives would yield substantially greater benefits in terms of risk reduction if they were redirected towards motor vehicle safety or food and drug regulation. Notwithstanding the limitations in techniques of

socio-economic analysis and the difficulties of weighing different policy outcomes (which may have very different distributive consequences), an increased sensitivity to the available choices and tradeoffs could contribute to a more efficient allocation of resources and a greater overall reduction in risk.

FOOTNOTES

1. R. Coase, "The Problem of Social Cost," Journal of Law and Economics 3 (1960), 1-44.

2. W. Oi, "Economics of Product Safety," Bell Journal of Economics and Management Science 4 (Spring 1973), 3-28.

3. These estimates are from, "The Value of Saving a Life: Evidence from the Labour Market," by Richard Thaler and Sherwin Rosen in Nester E. Terleckyj (ed.), Studies in Income and Wealth, Vol. 40 (New York: NBER). Since these results are based on high-risk occupations they may underestimate the true extent of wage premiums. Robert Smith in his study, The Occupational Safety and Health Act (Washington, D.C.: A.E.I., 1976), estimated wage premiums for risk at almost ten times the level indicated by Thaler and Rosen.

4. This is well highlighted in S.B. Linden, The Harried Leisure Class (New York: Columbia Univ. Press, 1970). See particularly, Chapter VI, "The Rationale of Growing Irrationality".

5. See, for example, Y. Kotowitz and F. Mathewson, "Some Issues in Public Advertising," Journal of Contemporary Business 7 (4) 1978, 123-34.

6. A. Tversky and D. Kahneman, "Judgement Under Uncertainty: Heuristics and Biases," Science, 185 (1974), 1124-31.

7. See P. Halpern and J. Carr, Liability Rules and Insurance Markets, (Ottawa: Consumer and Corporate Affairs Canada, forthcoming).

8. M.J. Hinich, "A Rationalization for Consumer Support for Food Safety Regulation," Department of Economics, Virginia Polytechnic Institute (processed), 1975.

9.. O.A. Davis and M.I. Kamien, "Externalities, Information and Alternative Collective Action," in Haveman and Margolis (eds.) Public Expenditure and Policy Analysis (Chicago: Rand McNally, 1970), 82-104.

10. P. Nelson, "Advertising as Information," Journal of Political Economy 82 (July/August, 1974), 729-54. Also L. Telser, "Advertising and Competition," Journal of Political Economy, 72 (December, 1964) 537-62.

11. N. Cornell, R. Noll and B. Weingast, "Safety Regulation," in Owen and Schultze (ed.), Setting National Priorities: The Next Ten Years (Washington, D.C.: Brookings, 1976) 457-504.

12. Ibid. p. 466.

13. C.S. Colantoni, O.A. Davis and M. Swaminuthan, "Imperfect Consumers and Welfare Comparisons of Policies Concerning Information and Regulation," Bell Journal of Economics 7 (Autumn 1976), 602-15.
A similar analysis is given by D. Auld, "Imperfect Knowledge and the New Theory of Demand," Journal of Political Economy, 80 (Nov/Dec 1972), 1287-94.

14. S. Rosen, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," Journal of Political Economy, 82 (Jan/Feb 1974), 34-55.

15. While this analysis is based on the work by Rosen, it differs from the analysis he employs in his 1974 paper. The latter examines the loss in welfare resulting from a

standard which causes the consumer to purchase more of a quality attribute than he would have freely chosen. There is no attention given to information problems which may cause consumers to misperceive the costs and/or benefits associated with his market decision.

16. An excellent examination of the interrelationship among the goals of an accident prevention system is provided in G. Calabresi, The Costs of Accidents: A Legal and Economic Analysis (New Haven: Yale Univ. Press, 1970).

17. Final Report of the National Commission on Product Safety (Washington, D.C.: U.S. Gov't Printing Office, June 1970), p. 11.

18. These studies include: M.P. Friedman, "Quality and Price Considerations in Rational Consumer Decision Making," Journal of Consumer Affairs (Summer 1967), 13-23; A Oxenfeldt, "Consumer Knowledge: Its Measurement and Extent," Review of Economics and Statistics, 32 (1950), 300-14; and R.T. Morris and C.S. Bronson, "The Chaos of Competition Indicated by Consumer Reports," Journal of Marketing, 33 (July 1969), 26-34.

19. H. Kunreuther, Disaster Insurance Protection (New York: John Wiley and Sons, 1978).

20. H.A. Simon, "A Behavioural Model of Rational Choice," Quality Journal of Economics 69 (1955) 99-118.

21. Kunreuther, supra note 19.

22. It should be noted that this area represents the sum of the losses facing individual consumers and except in the unlikely case that all consumers made errors of the same magnitude, this will not equal the loss estimated on the

basis of aggregate market demand curves. In general the sum of individual losses will exceed the welfare loss estimate derived using data from market demand curves. Peltzman has been critized in this regard for using market demand curves to estimate the losses associated with consumer ignorance about the efficacy of new drugs. See S. Peltzman, "An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments," Journal of Political Economy 81 (Sept./Oct., 1973) 1049-91; and Thomas McGuire, Richard Nelson and Thomas Spavins, "An Evaluation of Consumer Protection Legislation: The 1962 Drug Amendments: A Comment," Journal of Political Economy 83 (June, 1975) 655-661.

23. This point, which is often ignored in economic impact studies of specific regulations, is emphasized in Cornell, Noll and Weingast, supra note 13, p. 467. Potential problems of this nature arise from the partial nature of the analysis in Section E.

24. Aqua Slide 'n Dive Corp. v. CPSC, Court of Appeal, 5th Circuit, March 3, 1978, p. 2498.

25. George Eads notes the importance of distinguishing between benefit estimation and hazard identification. Benefit estimation starts with hazard identification, but it involves many more steps. First, the nature of the process by which the hazard is generated must be well understood. Second, the theoretical effectiveness of a proposed remedy must be determined. Third, this theoretical effectiveness must be modified to take account of "real world" considerations. George Eads, "The Benefits of Better Benefit Estimation", paper prepared for the Conference on the Benefits of Governmental Health and Safety Regulations, sponsored by the Public Interest Economics Foundation and

the National Science Foundation, Berkely Springs, West Virgina, Oct 12-13, 1978.

26. S. Peltzman, "The Effects of Automobile Safety Regultion," Journal of Political Economy 83 (1975), 677-726.

27. P. Linneman, "A Case Study of the Impacts of Consumer Safety rds: The 1973 Mattress Flammability Standard," Department of Economics, University of Chicago, Center for the Study of the Economy and the State, Working Paper No. 008.

28. U.S. v. Carroll Towing, (1947), 159 f. 2d 169 (2d. Cir.), 173.

29. See, for example, J.P. Brown, "Toward An Economic Theory of Liability," Journal of Legal Studies (June, 1973) 323-49.

30. A. Shapiro, "An Economic Analysis of Consumer Redress Mechanisms," (Ottawa: Consumer and Corporate Affairs Canada, 1980).

31. S.B. Ash, Consumer Satisfaction and Complaining Behaviour: Major Findings and Directions for Action (Ottawa: Consumer and Corporate Affairs Canada, 1980)

32. S.B. Burman et al., The Use of Legal Services of Victims of Accidents in The Home - A Pilot Study," Modern Law Review 40 (1977), 47-57.

33. Shapiro, supra note 30.

34. Halpern and Carr supra note 7.

35. Ibid.

36. Ontario Law Reform Commission, Report on Products Liability (Toronto: Ministry of the Attorney General, 1979), p. 18.

37. Lawrence Cohen v., Coca-Cola Ltd. (1967) S.C.R. 469-474. A similar decision was handed down in Hart v. Dominion Stores Ltd. (1968) 1 O.R. 775-780.

38. Ontario Law Reform Commission, op. cit., p. 15. The courts have maintained, for example, that a chair must be safe to stand on: Phillips v. Ogle Aluminum Furniture Inc., 106 Cal. App. 2d 650, 235 p. 2d 857 (1951).

39. The Saskatchewan Consumer Product Warranties Act, 1977 provides as follows:

> 34.(1) In any action arising under this Act, proof that a consumer product does not comply with mandatory health or safety standards set under an Act of the Parliament of Canada or an Act of the Legislature or with quality standards set by regulation constitutes prima facie evidence that the consumer product is not of acceptable quality or fit for the purpose for which it was brought.
>
> (2) No proof that a consumer product complies with the standards mentioned in subsection (1) shall constitute prima facie evidence that the consumer product is of acceptable quality or fit for the purpose for which it was bought.

40. The Ontario Law Reform Commission noted that under the present law of contract only a buyer of a defective product can sue for breach of an implied warranty and only a seller can be sued for such a breach. In other words, where a purchaser suffers injury from a defective product it is the retailer and not the manufacturer that can be held strictly liable. A manufacturer who is responsible for producing

defective goods may be liable in tort, but only if the injured party proves negligence. Moreover this remedy may be ineffective if the manufacturer is unknown, insolvent or beyond the jurisdiction. To remedy these anomalies and deficiencies the Commission recommended the adoption of a principle of strict liability in tort for damage caused by defective products.

Other proposals relate to the possibility of developing new adjudacative forums which would be less costly and more attractive to consumer complainants. Shapiro (supra note 30) notes that any successful mechanism must involve four partially related elements: low costs, simple procedures, speed and publicity. The forums proposed include modified small claims courts, consumer courts, consumer boards or agencies (functioning similar to labour relations boards), mediation facilities and arbitration facilities.

41. J. Steiner, "Economics, Morality, and the Law of Torts," University of Toronto Law Journal, XXVI, (Summer, 1976), 227-52.

42. D. Lecraw, "Voluntary Standards as a Regulatory Device," Study prepared for the Regulation Reference of the Economic Council of Canada, forthcoming.

43. Michael S. Hunt, "Trade Associations and Self-Regulation: Major Home Appliances," in R.E. Caves and M.J. Roberts (eds.), Regulating the Product: Quality and Variety (Cambridge, Mass.: Ballinger, 1975), 39-55.

44. National Commission on Product Safety, supra note 17, p. 2.

45. Sylvia Ostry, "Consumerism: Why, Whence and Where," speech to the Canadian Club, Toronto, April 14, 1975.

46. Federal jurisdiction in the area of hazardous substances could also arise from the federal government's general power to pass legislation for the peace, order and good government of Canada. The courts have held for example, that control of atomic energy falls within the general power. In addition the federal government could use its taxation and spending powers to create financial incentives which would influence the production and sale of hazardous substances. It should be noted that the trade and commerce power is generally assumed to apply to legislation which is economic in nature. The question of whether this power allows Parliament to pass legislation that is motivated by health and safety, rather than economic, considerations, does not appear to have been decided by the courts. For a general discussion of the jurisdictional issues see R.T. Franson and A.R. Lucas, "The Legal Control of Hazardous Products in Canada," in Franson, Lucas, Giroux and Kenniff, Canadian Law and the Exposure to Hazards, Science Council of Canada Background Study No. 39, (Ottawa: Minister of Supply and Services Canada, 1977). Also, L.J. Romero, Federal-Provincial Relations in the Field of Consumer Protection, (Ottawa: Consumer Research Council, 1975).

47. Quoted by Grace MacInnis in Commons Debate, Feb. 24, 1969, P. 5887.

48. Hazardous Products Act 1968-69, c. 42, s. 1.

49. See J.W. Black, "In a Safety Conscious Marketplace - Whither Plastics?," paper presented to the 33rd Conference, Society of Plastics Industry of Canada, Ottawa, May 18, 1976.

50. See, for example, Commons Debates, Feb. 24, 1969, 5881-5893.

51. Boards of Review were established in connection with the regulations prohibiting spectacle frames containing

cellulose nitrate (reported May 21, 1971), and the regulation banning metal plastics containing hydrocyanic acid when packaged as consumer products (reported Sept. 16, 1971). Both Boards recommended that the regulations in question "be continued and maintained".

52. For a discussion of the Consumer Product Safety Act see, J.R. Patton Jr. and E.B. Butler, "The Consumer Product Safety Act - Its Impact on Manufacturers and the Relationship between Seller and Consumer," Business Lawyer 28 (April 1973), 725-40. Also, Cornell Noll and Weingast, supra note 11.

53. A potential years of life lost (PYLL) measure ranks causes of premature mortality by assigning a higher weight to deaths occuring to younger segments of the population i.e., PYLL = $\sum_{i=1}^{69} a_i d_i$ where d_i = number of deaths between age i and i+1, and a_i = remaining years to live until age 70. See J.M. Romeder and J.R. McWhinnie, "The Development of Potential Years of Life Lost as an Indicator of Premature Mortality," staff paper 77-2, Long Range Health Planning, Health and Welfare Canada. Quality adjusted life years (QALYs) are designed to measure benefits of government interventions in terms of the quality of survival they generate. The output of life-saving activities is assigned a utility or weight between 1, representing a year of life at full function, and 0, a year without life, depending on the extent of hardship or incapacitation, R. Zeckhauser and D. Shepard, "Where Now for Saving Lives," Law and Contemporary Problems 40 (Autumn 1976), 4-45.

54. Statistics of Hospitalized Accidents British Columbia, prepared by Research Division, Hospital Programs, Ministry of Health, Victoria.

55. It cannot be determined from the regressions whether the accident rate declined because product regulations succeeded in making consumer products safer, or because the regulations raised the relative price of more hazardous products thereby causing consumers to shift to the purchase of less risky goods. If the latter, the same result could be achieved much more efficiently through the imposition of a tax on hazardous goods. The examination of specific regulatory impacts suggests, however, that product regulations have indeed improved the design and significantly increased the safety of a number of consumer products.

56. The federal SEIA (Socio-Economic Impact Analysis) program, which came into effect August 1, 1978, requires that economic impact studies be prepared for all major new social regulations, and that a summary of the SEIA be published along with the draft regulation in the Canada Gazette. A regulation is defined as "major" if one of the following holds:

(a) the direct and indirect social costs of implementing the proposal will exceed $10 million (at 1979 prices) in a single continuous period of 12 months;
(b) the direct and indirect social cost of implementing the proposal will exceed $10 + 2 x million dollars (at 1979 prices) over a period of x years from the time the first such costs are incurred, when the said costs are discounted to the first year of the period at a real discount rate of 10 per cent, for any x less than or equal to 10. (This means, for example, that if the discounted costs are $15 million in the first two years, the regulation exceeds the cost criteria even if the discounted costs over the first four years are only $17 million);
(c) the direct and indirect social costs (at 1979 prices) of implementing the proposal, discounted at 10 per cent, exceed $35 million over the foreseeable future. (For example, a proposed regulation which would cost $3.5 million a year, forever).

Treasury Board, Administration Policy Manual, Chapter 490, "Socio-Economic Impact Analysis of Health Safety and Fairness Regulations," p. 26.

57. See Lambert and Lambert v. Lastoplex Chemicals Co. Ltd. and Barwood Sales (Ontario) Ltd. (1972) S.C.R. 569. In this case the Supreme Court of Canada held that the manufacturer of a highly flammable floor sealer had not adequately drawn the user's attention to the danger posed by a pilot light in an adjacent room. While the container bore warnings to keep away from "open flames" these were judged to be insufficient, in that they didn't bring home the danger of a pilot light in an adjacent room behind a closed door.

58. Report by the Committee on Consumer Policy, Compulsory Labelling of Prepackaged Consumer Products, (Paris: Organization for Economic Co-operation and Development, 1974).

59. Contemporary Research Centre Ltd., A Study on Awareness and Identification of Hazardous Product Symbols, prepared for Consumer and Corporate Affairs Canada, 1977.

60. Poison Control Program Statistics, Poison Control and Adverse Reaction Programs Division, Health Protection Branch, Health and Welfare Canada.

61. The one cent figure comes from discussions between CCA officials and manufacturers of household chemical products.

62. Canadian Consumer, August 1979, p. 33.

63. The effectiveness of the regulation regarding the use of child-resistant outer containers for instant glues could, for example, be questioned.

64. Bureau of Economic Analysis, Consumer Product Safety Commission, "Potential Economic Effects of the Pacifier Regulation," (April 15, 1977), and "Probable Economic Effects of the Rattle Regulation," (March 8, 1978).

65. Bureau of Economic Analysis, "Potential Economic Effects of the Pacifier Regulation," p. 6.

66. Ellen Roseman, Globe and Mail, July 7, 1977, p. F4.

67. The development of the U.S. crib standard is well described in S. Kelman, "Regulation by the Numbers - A Report on the Consumer Product Safety Commission," The Public Interest, 36, (Summer, 1974), 83-102.

68. This comes from minutes of the meeting between the Product Safety Branch and crib manufacturers, Tunney's Pasture, Ottawa, June 12, 1973.

69. National Injury Information Clearinghouse, U.S. Consumer Product Safety Commission, Tabulation of Data from National Electronic Injury Surveillance System.

70. Office of Strategic Planning, Consumer Product Safety Commission, "Impact of Crib Safety Activities on Injuries and Deaths Associated with Cribs." (February 1979).

71. Statistics Canada has physicians' reports on cause of death on file. These were examined for the age group 0-3 in category 913.0 to seperate crib-related deaths from other

infant deaths due to "accidental mechanical suffocation in bed and cradle".

72. See, for example, Ellen Roseman, Globe and Mail, July 7, 1977, p. F4. The hockey helmet standard is also regarded as a success story by the Canadian Standards Association, which developed the standard. See, for example, J. Kean, "Benefits and Efficiencies of Standardization", presented at the Special Seminar sponsored by the Standards Council of Canada, Oct 20, 1975, 2&3.

73. Kropp, Marchant, and Warshawski, "An Analysis of Head Injuries in Hockey and Lacrosse," prepared for Fitness and Amateur Sport Branch, Department of National Health and Welfare (1974-75).

74. Hastings, Cameron, Parker and Evans, "A Study of Hockey Injuries in Ontario," Ontario Medical Review 41 (November, 1974), 686-98.

75. J. Fekete in his article, "Severe Brain Injury and Death Following Minor Hockey Accidents: The Effectiveness of the 'Safety Helmets' of Amateur Hockey Players," Canadian Medical Association Journal 99 (1968), 1234-39, provides the case history of two players in New Brunswick who died during 1968 from head injuries sustained while wearing a helmet.

76. Marchant, Roy and Warshawski, "Sport Safety Research," prepared for Fitness and Amateur Sport Branch, Department of National Health and Welfare (1973-74).

77. P.S. Bishop, "Ice Hockey Helmets: Using a Mathematical Model of Head Protection for Evaluating Standards," Journal of Safety Research, (December, 1976) p. 169.

78. An excellent survey of the literature on labelling is provided in J.A. Miller, Labelling Research - The State of the Art, (Cambridge: Marketing Science Institute, November, 1978).

79. Figure 5a comes from Miller, ibid., who in turn footnotes H. and S. Thorelli, Consumer Information Handbook: Europe and North America (New York: Prager, 1974), p. 48.

80. Consumer Product Safety Commission, Directorate for Hazard Identification and Analysis, Hazard Analysis - Injuries Involving Architectural Glass, November 1974.

81. Fred O'Riordan and Lee McCabe, A Case Study: Safety Glass Regulations under the Hazardous Products Act (Ottawa: Minister of Supply and Services Canada, 1980).

82. The NCPS noted that 15,000 children under 15 die each year from accidents and another 17 million are injured severly enough to restrict normal activity or require medical attention. While these figures refer to all types of accidents (including automobile accidents) they were cited in the 1969 Congressional hearings onthe Child Protection and Toy Safety Act. According to Carl Fisher a staff report of the NCPS estimated that in 1967 the number of children under 15 who died of accidents involving toys was not 15,000 but 72. See Carl Fisher, "Tempest in Toyland," in Consumerism - Things Ralph Nader Never Told You by the Editors of Fortune, (New York: Harper and Row, 1972).

83. Directorate for Hazard Identification and Analysis - Epidemiology, (HIA) Consumer Product Safety Commission, Special Report (April 1978), Consumer-Product-Related Injuries Treated in Hospital Emergency Rooms Jan. 1, 1976 - Dec 31, 1976.

84. Calculated from HIA data, supra note 83 and CPSC Product Profile on Generic Toy Safety, October 1976.

85. HIA, Consumer Product Safety, Special Report (May 1978), Injuries Associated with Small Objects.

86. In the U.S., the CPSC, nonetheless provided a specific list of toys which are covered by its recent small parts regulation. The Commission also listed the factors it would consider before determining which other toys might be intended for children under 3. The difference between the Canadian and U.S. approach in this area is an aspect of the more general reliance in the U.S. on formal rules and procedures.

87. C.W. Stevens, "One Producer Finds Recall Is Best Policy for a Hazardous Toy," Wall Street Journal, March 2, 1979.

88. Information contained in memo from officer of Product Safety Division, Nov 29, 1977.

89. Memo from officer of Product Safety Division, March 11, 1976.

90. This is based on conversations with Mr. W.M. Griffith of the Canadian Toy Manufacturers Association, Mr. G. Young of the Canadian Toy Importers Association and Mrs. L. Nilson of the Canadian Toy Testing Council.

91. Bureau of Economic Analysis, Consumer Product Safety Commission, "Economic Impact of Sharp Metal Edge Regulations," (n.d.).

92 Submission by the Consumer's Association of Canada to the Minister's Task Force on Crash Protection for Infant and

Child Passengers in Motor Vehicles (along with related background documents).

93. The Task Force was established in December, 1978, and its report was released in June, 1980. Task Force Report to the Minister of Consumer and Corporate Affairs Canada on Crash Protection for Infand and Child Passengers in Motor Vehicles (Ottawa: Supply and Services Canada, 1980).

94. Submission by the Product Safety Branch to the Minister's Task Force on Crash Protection for Infant and Child Passengers in Motor Vehicles.

95. Consumer's Association of Canada, supra note 92.

96. The Task Force on child restraints inferred from available evidence that the proportion of Canadian consumers who misuse restraint systems is "in the 50% area". Task Force Report, p. 24.

97. Though the cost of reducing risk may be substantially higher as one moves to a more stringent standard, it still may, of course, be desirable to adopt the higher standard. The rate of return implied by the cost-effectiveness ratio may be highly favourable, and it may not be possible to secure a greater reduction in risk through any alternative allocation of resources.

98. Product Safety Branch, supra note 94.

99. The Task Force Report, which was made public in June, 1980, recommended that "as an interim measure", pending more complete and sophisticated test results, the existing limitations on head excursion be significantly relaxed. This recommendation was based on experience in the U.S. market where requirements are less stringent, and it

was intended to respond to concerns with respect to the availability of car seats and the inconvenience of using existing designs which require special anchorages. The Report also recommended that: the regulations be extended to include infant carriers; labelling requirements be improved and warnings on the need for correct use of restraint systems be strengthened; and the test methodology be amended with a view, particularly, to increasing its precision. Among its general recommendations was an appeal to the provinces "to require the use of restraint systems for all child passengers, regardless of age and location in the vehicle".

100. Data provided by Canadian Soft Drink Association.

101. This comes from Thorne, Stevenson and Kellogg, A Socio-Economic Impact Analysis on 1.5 Litre Soft Drink Bottle Regulations, prepared for Consumer and Corporate Affairs Canada, May 1980. The cost of bottling soft drink beverages was estimated at $0.15 per bottle and this was multiplied by 15%, the estimated efficiency loss, and by the volume of output previously purchased in 1.5 litre containers. These calculations result in an estimate of efficiency loss of $4.3 million over a 13 month period; calculated over 12 months, the additional cost is around $3.9 million.

102 P. Cale, "Is the 750 Next?" Canadian Packaging, November, 1979.

103 See, for example, Remarks by G. Scott, Deputy Minister, Ontario Ministry of the Environment to the Ontario Soft Drink Association Annual Convention, Toronto, September 24, 1979.

104 Returnable bottles may withstand greater internal pressure than non-returnables since their walls are made of thicker glass, but they are likely to be subjected to more round trips and to receive abuse during repeated trips between bottler, store and consumer. An in-depth investigation by the CPSC (1975) did not lead to a conclusion as to which type of bottle is more hazardous.

105 Bureau of Epidemiology, U.S. Consumer Product Safety Commission, Hazard Analysis of Carbonated Soft Drink Bottles (April 1975).

106 Based on data submitted by the National Soft Drink Association (Washington, D.C.), to the Consumer Product Safety Commission, July 29, 1977.

107. Effective November 21, 1980 the ban on 1.5 litre containers in Part I of the Schedule to the Act has been revoked and replaced with an amendment to Part II of the Schedule, which would allow the sale of 1.5 litre soft drink bottles which meet specified labelling and performance requirements. A combination drop and drill test is to be employed. The drop test involves dropping a bottle from 75 centimeters and allowing glass fragments to fly within a cylinder two meters in diameter; at least 95 percent of the dry weight of the container must remain inside the cylinder. The drill test involves initiating cracks into the side of the bottle to test for spontaneous explosions. It is expected that 1.5' litre bottles currently in stock can meet the proposed standards if they are coated with a layer of plastic.

108. Reported in Kunreuther, supra note 19.

109. R. Eisner and R. Strotz, "Flight Insurance and the Theory of Choice," Journal of Political Economy 69 (1961) 355-68.

110. See, for example, G. Swartz, "The Explosion of David Barham," Graduate, University of Toronto, (Jan/Feb 1980).

111. A preliminary study for the CPSC found more than 100 consumer products that might contain asbestos - including such everyday products as toothbrushes and car mufflers. The information from that study, which came largely from a search of published sources and patent reports, is being expanded and amended on the basis of manufacturers' reports. It should be noted that the focus of the Hazardous Product Act is much broader than U.S. legislation in this area, and could also cover the risk posed by asbestos in industrial use and construction.

112. On this see Kelman, supra note 67, and Cornell, Noll and Weingast, supra note 11.

113. The information in this section comes mainly from discussions with employees of the Product Safety Division and an examination of the minutes of Product Safety Committee meetings.

114. For example, the minutes of an early meeting on the crib standard (June 12, 1973) record the following: "Mr. _____ stated that product safety inevitably increases the cost but that since every manufacturer must comply to these standards, the competitive balance should not be disturbed. Everyone concurred."

115. H. Grabowski and J. Vernon, "Consumer Product Safety Regulation," American Economic Review (May 1978).

116. In this regard it is particularly notable that the Canadian flammability standard for children's sleepwear requires only slow-burn times and not self-extinguishment as in the U.S. The U.S. standard requires the application of a flame retardant on most materials and this will significantly affect the price and the appeal of the garment. One flame-retarding chemical, Tris, which had been in widespread use, has been recognized to be a carcinogen and is now banned in both Canada and the U.S.

117. Referred to in Jonathan J. Guss, "Product Quality - A Multidisciplinary Perspective," Meredith Lectures, Oct. 12, 1979.

118. The 1973 and 1974 survey of mattress producers found that approximately 20 percent were not in compliance with the standard and its associated testing and record keeping requirements. Forty-three percent of these violations were by firms with annual sales less than $100,000 (1973 dollars) and 81 per cent of all violations were by firms with sales under $500,000. At the same time only 5 percent of the sample violations were by firms with sales over $3.5 million. Further, the smaller firms were much more likely to have committed multiple violations of the standard. With respect to children's sleepwear the Commission found that the smallest firms in the sample were in violation 50 percent of the time, compared to 38 percent for the larger firms. See, U.S. Consumer Product Safety Commission, 1976 Annual Report (Washington, D.C.: U.S. Gov't Printing Office, 1976).

119. The National Home Accident Surveilance System in the U.K. has been put forward as an example of the type of relatively low-cost reporting system which could be introduced in

Canada. Vera Gellman, "Report on Visit to Department of Prices and Consumer Protection," March 25, 1977.

120. D. Pittle, "Regulatory Trends at the National Consumer Product Safety Commission," in Jones and Gardiner (eds.), Consumerism (Lexington Books, 1976).

121. The importance of having government departments adopt a similar methodolgy and similar assumptions with respect to general socio-economic variables is recognized in the federal SEIA program. Tresury Board, supra note 55.

122. See Martin J. Bailey, Reducing Risks to Life: Measurement of the Benefits (Washington: American Enterprise Institute, 1980) 9 & 10.