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Gregory Kaminski
Health Canada, Ottawa, Ontario

ANALYSIS OF PROPOSED CHANGES TO THE POLISH RETIREMENT SYSTEM AND A COMPARISON TO SOLUTIONS USED BY THE CANADIAN SYSTEM

Summary

A system similar to the second capital pillar in Canada, called Employee Capital Plans (Pracownicze Plany Kapitałowe – PPK) have been recently introduced in Poland. This research article analyses whether the introduction of PPK makes sense at this time, reminding a failed open pension funds experiment of the late 90s and early 2000. The PPK concept moves the pension reform somewhat to the 3rd pillar, abandoning the elements of compulsory universal system. It is being promoted as a voluntary scheme, but employers are forced to participate and all employees are automatically enrolled, with an option to opt out. The premiums are defined but benefits are not. The paper compares the Polish and Canadian retirement framework and proposes an adaptation of certain Canadian solutions, such as clear division between three pillars of the social security system.

Key words: pension plans, social security, pension reform.

JEL codes: H55

Introduction

In 2015, the author of this study postulated a reform of the Polish social security system based on the Canadian system (Kamiński 2015). One of the parts of this system is the pillar based on the capital method of financing (Canada Pension Plan – CPP), mandatory and managed by a state institution (Canada Pension Plan Investment Board). It is a plan with a defined contribution, but also a defined benefit. Currently, Employee Capital Plans (Pracownicze Plany Kapitałowe – PPK) have been introduced in Poland, a system similar to the second capital pillar in Canada. It seems that the PPK concept is burdened with similar errors, which were encumbered with the Open Pension Funds (Otwarte Fundusze Emerytalne – OFE) implemented in 1999. This time, however, this concept moves somewhat to the 3rd pillar, leaving elements of compulsory universal system. It is a voluntary system, but employers must participate and all employees are automatically enrolled. However, the premium is defined and benefits are not. Let's look at what the author proposed in his doctoral dissertation and analyze whether the introduction of PPK makes sense in the light of comparisons of the Polish system with the Canadian one.

One of the Polish social security experts, Professor Leokadia Oręziak, criticizes not only the PPK project, but also any capital-based pension system (Skwirowski 2018). In her opinion, only a pay-as-you-go system based on intergenerational solidarity can pass the test. In this regard, the author would like to remind you that well-managed systems where the second and third pillars are based on the capital principle (for example the Canadian one) have been functioning for many years. The concept of intergenerational solidarity is very easy to propose and populist, but unfortunately it fails the test of simple mathematical analysis. With the current life expectancy and low natural growth, it is impossible to maintain a system based only on the concept of intergenerational solidarity and to ensure 70% replacement of pre-retirement income (a level recognized as safeguarding decent existence).

Comparison of pay-as-you-go and three-pillar system

In its assumptions, the pay-as-you-go system works when the income from the pension contributions of a part of the working society covers expenditure on pensions for those who have finished their employment activity. The system is not at risk when the birth rate is high and the retirees are few and don't live long after retiring. When the retirement time increases and the number of retired people in relation to the professionally active begins to increase, this system is doomed to bankruptcy.

The so-called demographic dependency ratio is calculated as the ratio of people aged 65 and above to people aged 20-64. This indicator for Poland in year 2000 was 0.2, while in 2050 it is expected to reach 0.6. In addition, in Poland, the average retirement age in 2014 was 60.4 years (Social Insurance Company, ZUS 2014) being one of the lowest in Europe. Older people (65+) in Poland in 2014 constituted over 15% of the total population, a Polish citizen was on average 39.2 years old, while the old age index showing the relation of "grandparents generation" (65 and more) to "grandchildren generation" (0-14 years) was 103, which means almost numerical balance between grandparents and grandchildren.

According to the Central Statistical Office (CSO, Główny Urząd Statystyczny, GUS) forecasts, the number of retirees per 100 people of working age will be steadily increasing. It is estimated that in 2020 this number will reach 38, while in 2030 – 46. It is also predicted that in 2050 the population aged over 50 will constitute over 50% of the total population (GUS, 2018), i.e.

the current demographic situation of Poland will change radically already in the next decade. At the same time, in 2050 Poland will become one of the European countries with the most aged population. According to Eurostat forecast, the EU population by 2050 will increase by 3.6%, however in Poland it will decrease by about 10% (GUS 2017).

The state is already adding huge sums from income taxes to the Social Insurance Fund (Fundusz Ubezpieczeń Społecznych, FUS). In 2018, the FUS budget deficit amounted to approximately PLN 46 billion. For comparison, in 2013 the subsidy from the state budget for FUS amounted to PLN 37 billion. Consequently, it should be noted that there has been an increase in subsidies of almost 10 billion in just five years. In addition, the subsidy for the Bridge Retirement Fund is PLN 600 million, and for the Pension Fund – PLN 17 million, while for the Fund for Rehabilitation of Disabled People – PLN 3.6 million. If we are able to accept indebtedness of the state budget indefinitely and the payment of larger sums for retirement benefits, then the intergenerational solidarity system will work until it bankrupts our public finances (e.g. constitutional threshold of 60% of GDP).

In many countries, which are in a similar demographic situation as Poland, it was decided to take other steps that would directly offload the state budget and, in their assumptions, protect the interests of future pensioners. It must be admitted that the effectiveness of such systems can be fully assessed only after the entire generation that participated in them reaches retirement age, i.e. it is a period of about 30-40 years.

Let's see how a three-pillar pension system, which combines elements of pay-as-you-go – compulsory (with a defined contribution and defined benefit), and capital – voluntary, can be constructed. In Canada, the basic collateral for old age, covered by the state from general tax revenues, is the old-age pension (OAS), granted to all citizens upon retirement (Government of Canada 2018a). It provides around a 15% replacement rate for average national earnings. Pillar II is an obligatory and complementary pillar, based on the capital financing method. Funds accumulated in this part of pension insurance (derived from employee contributions) are managed, invested and paid by an independent institution under state control. The scope and form of this control are determined so that the institution is responsible for its financial results (before the Minister of Finance and before the House of Commons [lower chamber of the Parliament]), while state bodies have limited rights to dispose of the institution's funds (for purposes other than pension insurance). This is the so-called Canadian Pension Plan (CPP). It provides a replacement rate for the average national wage of 25% (Government of Canada 2018b). Together, pillars I and II provide a replacement rate of 40% of the national average earnings. Pillar III is a complementary, voluntary part based on various principles of equity financing, where contributions come from both

Table 1. Types of occupational retirement plans in Canada

Plans with defined benefits				Plans with defined contributions		Combined plans (features of both: defined benefits and contributions))		
Permanent benefit	**Career average**	**Best average**	**Moving benefit**	**Purchase**	**Profit distribution**	**Combination**	**Cash balance**	**Multi-employer**
The benefit does not depend on earnings, only on the length of employment	Benefit for each year is a percentage of average earnings	Benefit for each year is a percentage of earnings in the best year or the best range (3, 5 or 10 years)	The employer provides a basic level of payment. employee contributions accumulate until retirement and are used to purchase other benefits from the plan (e.g. shares, medical care plan)	The employee contribution is a fixed percentage of earnings and the pension depends on the amount of these contributions	The employer's contribution depends on the company's profit (minimum 1% employee earnings). The benefit depends on the accumulated contribution	Old-age pension of one type depends from minimum of the second type or retirement is the sum of two different types	Insured receive loans based on a defined financing principle that is later paid out as benefits at a pre-determined rate	The amount of contributions and benefits is set out in a collective agreement. Benefits can be reduced if contributions are not sufficient to cover the agreed amount of benefits

Source: own study according to Morneau Sobeco Handbook of Canadian Pension and Benefit Plans 13th ed. 2005, Toronto.

employees and employers. It is postulated that this pillar should add another 30% replacement rate. It is believed that retirees should not feel a decline in their standard of living after retirement with a replacement rate of 70% (Alini 2018). Table 1 shows how different types of Canadian occupational retirement plans are in the third pillar.

Proposed changes in the Polish pension system

At present, the Polish state is forced to contribute to retirement benefits from its budget; to reduce the pressure of the pension system on public finances. The author of this study postulates the transition to a system similar to that used in Canada (and also proposed by the World Bank). In the proposed system, Pillar I (i.e. the base and pay-as-you-go part) becomes a base security in old age, covered by the state from general taxes. This proposal is similar to the Canadian OAS, where basic pension is granted to all citizens after reaching the retirement age. On the other hand, Pillar II would become a compulsory and complementary pillar, based on the capital financing method (similar to Polish open retirement funds Otwarte Fundusze Emerytalne, OFE, a good experiment in its assumptions, but carried out ineptly). Funds accumulated in this part of pension insurance would be managed, invested and paid by an independent institution under state control. The scope and form of this control would have to be determined so that the institution would be responsible for its financial results, and the state authorities could not dispose of the institution's resources for purposes other than retirement insurance. Insured would be provided with a defined benefit dependent only on the length of participation in the fund and not on its financial results. This concept is similar to the Canadian CPP program. Pillar III would remain a complementary, voluntary part based on the principles of equity financing.

Recently, some steps have been taken in this direction, such as the introduction of individual retirement accounts (Indywidualne Konta Emarytalne, IKE and Indywidualne Konta Zabezpieczenia Emerytalnego, IKZE) and voluntary Employee Pension Plans (Pracownicze Programy Emerytalne, PPE). The latest introduction of Employee Capital Plans, obligatory for bigger enterprises and automatically enrolling all employees, is an attempt to shift the state's obligation to the third pillar. Major contributions are being made by the employer and employees, with a minimal help from the state.

The author is of an opinion that the scope and significance of the third pillar requires a careful public consultation followed by a thoughtful development of appropriate instruments. This development should be supported by amendments to tax laws, introduction of financial and tax relief programs as well as advertising and educational campaigns. It does not look like this is being presently pursued in Poland. The following tables present author's concept of a Polish three-pillar pension system.

Table 2. Proposed concept of the Polish pension system

Pillar/ characteristics	Pillar I	Pillar II	Pillar III
Initiative	state	state	enterprise and household
Protection	basic	standard	additional
Subsystems	basic	supplementary	supplementary

Source: own study according to Szumlicz (2010, p. 160).

Table 3. Proposed Polish version of the three-pillar pension system

Parts of the system	Accession principle		Financing principle
	compulsory	voluntary	
Basic	pillar I	-	pay-as-you-go (re-partition)
Supplementary	pillar II	pillar III	capital

Source: as in Table 2.

The proposed changes concern not only the method of financing the pension system, but also introduce a different concept of intergenerational solidarity and citizen care. By proposing the financing of benefits of the first pillar from general taxes, we are introducing elements of the Beveridge system (utilitarian egalitarianism) and moving away from the contribution system based on Bismarck's principles of redistributive liberalism. At the same time, the state's contribution is limited, planned, and does not work on the principle of patching the FUS budget. The basic part of the system remains pay-as-you-go, but this basic collateral is covered by the state, and not only from workers' contributions. It is a kind of extended intergenerational solidarity, where the funds for the basic part of the system come not only from the employed, but from all sectors paying taxes.

The second part, obligatory for all employees, would constitute for them a standard, supplementary security, financed on an equity basis. This part would ultimately fulfill both the role of intergenerational support and the capitalization vehicle of accumulated funds. Currently, some insured are still using OFE as capital collateral, which will soon be liquidated. Others use ZUS accounts. It should be mentioned here that a failed experiment with open pension funds has undermined public confidence in state-controlled capital solutions. Let's remind – when the OFE were started 7.3% of the retirement contribution was transferred to these funds, to then be reduced to 2.3%, with the remaining funds being moved from the capital program to individual ZUS retirement accounts. In practice, these funds were used for current pensions payments to make up for the resulting budget shortfall.

In the initial period of OFE activity, it seemed that the funds would have a large and positive impact on the Polish capital market (Szyszka 2004). High profit rates were expected to be achieved by pension funds [up to 10% on an annual basis Zaremba 2003]. However, after the 2007-08 crisis and losses recorded by most funds on a global scale, this proved unrealistic. Pension societies earned too much from managing pension funds, because regulations regarding the functioning of pension funds in Poland were not designed to motivate pension societies to manage the assets entrusted to them as effectively as possible. The shortfall of OFE was also influenced by the system of remuneration of societies, the mechanism of the minimum required rate of return, investment limits for OFE, as well as legal instability and lack of regulation of payments of benefits from pension funds. Changes in investment strategies of pension funds, diversification of funds due to risk and aggressiveness, and changes in investment strategies from passive to active were proposed. However, the changes were never introduced and, according to the author, removing the obligation to become an OFE member was like "throwing the baby out with the bathwater". It was contrary to the expectations of the pension reform, the main assumption of which was the introduction of a mandatory second pillar of a capital nature. The assumption of the capital pillar was correct, but the initiative was badly implemented and necessary state controls were never developed and applied.

Part three of the pension system, mainly voluntary and financed solely by the capital method, would constitute an additional and complementary part based on group and individual prudence. However, it is proposed that the role of the state in supporting this form of saving for old age should be much more active and significant than before. It cannot be excluded that participation in some employee funds supported or co-financed by employers or trade unions could be compulsory, as we can now see on the example of the PPK project.

Currently existing saving mechanisms in the third pillar

Currently existing saving plans in the third pillar are IKE, IKZE and PPE. IKE is an individual retirement account, to which the payment limit is 3 times the average forecasted monthly salary in the national economy for a given year (specified in the budget act), for 2018 this limit was PLN 13 329. Funds can be deposited in a bank, in investment funds or invested alone on the stock exchange. IKE accounts are offered by banks, insurance companies and brokerage houses. Investment in IKE is encouraged by the exemption from capital gains tax (the so-called 19% Belka[1] tax). According to the Polish Financial Supervision Authority, by 2017, Poles opened almost 950 thousand IKE accounts and accumulated over 7.5 billion zlotys on them (KNF 2018a).

IKZE, i.e. individual retirement security accounts, differ from IKE in that they offer two tax breaks, i.e. exemption from capital gains tax and the option of deducting an annual contribution from income, which reduces the tax base, i.e. personal income tax. The deposit limit is smaller than the one for IKE and amounts to 1.2 times the average forecasted monthly salary in the economy for a given year. This sum for 2018 was PLN 5,331. Acceptable forms of investment for funds accumulated on IKZE accounts are bank deposits, investment funds, stock securities, life insurance (investment) and pension funds (managed by universal pension societies). The number of IKZE accounts in 2017 was over 660 thousand, and PLN 1.3 billion was collected on them. It is still not very much compared to the total number of employees in the economy (about 16.5 million), but the number of accounts increases very rapidly (74% increase in IKZE accounts compared to the previous year) (KNF 2018b).

Employee Pension Programs is a form of collective saving in the third pillar, where employers pay monthly contributions (the so-called basic) to employees' accounts, which can reach the amount of 7% of remuneration. The amount of this premium is not included in the calculation of compulsory insurance premiums (ZUS), but you must pay personal income tax on it. In addition, the employee has the right to deposit an additional premium, the limit of which is equal to 4.5 times the amount of the average forecast monthly salary in the national economy for a given year. For 2018, this limit has been set at PLN 19,993.50. PPE can be run by one employer or as an inter-company fund. The following forms of investing (saving) are allowed: an employee pension fund with an investment fund, life insurance with an insurance capital fund in a life insurance company or in a mutual life insurance company or foreign management. It is a very good retirement saving tool, but definitely not used enough and popularized. According to KNF data, 1,494 employee pension programs have been registered, and 1042 programs are currently active. The total value of assets accumulated in the PPE is PLN 13.3 billion (KNF 2018c). In other words, employer pension programs are the strongest part of the third pillar of the pension.

Analysis of the Employee Capital Plans in the light of existing instruments

There are presently numerous saving instruments available in the third pillar (similar to those accessible to employees in Canada, although less diverse).

[1] Marek Belka was Poland's Finance Minister who introduced the tax in 2002.

In this context, it is surprising that it was decided to introduce the Employee Capital Plans (PPK), which are located somewhere between the second and third pillar, because they demonstrate the features of both (Public Information Bulletin 2018). They are quasi voluntary, but in reality compulsory for employers and in practice also compulsory for employees (everyone is automatically enrolled, you can unsubscribe, but it is difficult). The first group of companies to which PPK were introduced were companies employing at least 250 people. Their employees have been enrolled into the program since July 2019. On January 1, 2020, enterprises employing at least 50 employees became members of the PPK; enterprises with at least 20 employees will be enrolled on July 1, 2020 and on January 1, 2021, other employers and public sector entities will join the program.

The method of paying contributions is the same as for the compulsory pension security system. If an employee is employed by several employers, the contributions from each remuneration will be transferred to various PPKs, most likely managed by different financial institutions. As before in a case of OFE, funds accumulated on PPK are managed by investment funds supervised by the Polish Financial Supervision Authority (Komisja Nadzoru Finansowego). One can only hope that this supervision will be better than in the case of OFE; currently there is no limit on fees for operational costs (there is a limit of 0.5% for management assets and 0.1% for achieved results), which may result in very high fees. For comparison, managing the Canadian CPP program, whose funds are invested in financial markets, costs about 0.35% of assets. The PPK system also does not provide lifetime payments (as OFE did), nor does it guarantee their amount.

The new PPK concept tries to shift the burden and responsibility of managing the contributions to the second pillar of the pension system from the state to the employer and employees, and their financial management responsibility to private financial institutions. It is somehow surprising, as the current retirement payments from ZUS are kind of amalgamation of first and second pillars. It can be only expected that due to the increasing deficit of FUS, pensions provided by the government (benefits are not defined at the onset) will be decreasing. It is probably expected that PPK will be capable of filling that gap, but they are based on additional contributions.

The author believes that instead of introducing such a retirement saving instrument, it would be necessary to start a reform by properly defining and establishing the first and second pillars of the system. The current ZUS system is a defined contribution system, but not a defined benefit. In public consultations it should be admitted that the state is not able to maintain a 70% replacement rate of pensions and that savings in the third pillar are necessary to achieve this level. FUS receives huge subsidies from the Treasury and this will not change in the near future. It would be worth determining the basic civic pension paid by the state and foresee and plan expenses for this purpose. Establishing PPK is actually like a new OFE, only worse from the point of view of the insured, because it requires additional contributions. OFEs were financed from contributions previously (before the reform) directed to ZUS. PPK, on the other hand, take new money from employers and employees, without reducing the basic social security contribution.

It seems that the principal goal of the reform of the current system should be to organize it in terms of identifying mechanisms operating in the first and second pillar, ensuring defined disbursements from these pillars, and introducing a properly controlled capital gains method in the second pillar while defining the benefits in terms of length (time of disbursements) and amounts.

Additional saving instruments such as PPK bring confusion and uncertainty to a sensitive and growing sector. This sector needs greater financial and tax incentives (e.g. reduced social security contributions for investors in PPE, increased investment limits in IKZE, tax breaks for smaller entrepreneurs wanting to offer PPE to their employees) and increased educational action.

Conclusions

Adopting the proposed solutions from the Canadian pension system would allow to achieve the planned social and financial goals. It would be possible to provide pensioners with decent living conditions while reducing the costs of the system. Subsidies from the state budget to the pension system would decrease, establishing a real pension insurance contribution (perhaps integrated with other contributions) would allow for maintaining the financial liquidity of the system in the long term. At the same time, we should strive to define the role of the state in securing capital-based retirement benefits and to promote, through financial and tax reliefs, savings programs supported by employers and individual retirement accounts, and a gradual increase in the importance of the third pillar.

Bibliography

Alini E. (2018), *How much do you really need for retirement? We did the math,* Global News – Money, Toronto, 12.02, https://globalnews.ca/news/3981582/how-much--to-save-for-retirement-canada/ [access: 28.02.2018].

Biuletyn Informacji Publicznej Rady Ministrów (2018), *Wykaz prac legislacyjnych i programowych Rady Ministrów. Projekt ustawy o pracowniczych planach kapitałowych*. Warszawa. https://bip.kprm.gov.pl/kpr/bip-rady-ministrow/prace-legislacyjne-rm-i/prace-legislacyjne-rady/wykaz-prac-legislacyjny/

r19972221002,Projekt-ustawy-o-pracowniczych-planach-kapitalowych.html [access: 12.07.2018].

Government of Canada (2018a), *Old Age Security – Overview*, Ottawa, https://www.canada.ca/en/services/benefits/publicpensions/cpp/old-age-security.html [access: 22.07.2018].

Government of Canada (2018b), *Canada Pension Plan – Overview*, Ottawa, https://www.canada.ca/en/services/benefits/publicpensions/cpp.html [access: 22.07.2018].

Główny Urząd Statystyczny (GUS) (2018), *Podstawowe informacje o rozwoju demograficznym Polski do 2013 roku,* Warszawa, http://stat.gov.pl/cps/rde/xbcr/gus/L_podst_inf_o_rozwoju_dem_pl_do_2013.pdf [access 20.01.2018].

Główny Urząd Statystyczny (GUS) (2017), Konferencja prasowa Prezesa GUS. Notatka informacyjna, Warszawa, 31.01, http://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5693/33/1/1/sytuacja_demograficzna_polski_na_tle_europy.pdf; [access 20.01.2018].

Kamiński G. (2015), *Społeczno-ekonomiczna efektywność pracowniczego systemu ubezpieczeń społecznych w Polsce i w Kanadzie (studium porównawczo-adaptacyjne),* Ph. D. theses, Szkoła Główna Gospodarstwa Wiejskiego w Warszawie, Wydział Nauk Ekonomicznych, Warszawa.

Komisja Nadzoru Finansowego (KNF) (2018), *Dane ze sprawozdań dotyczące IKE*, Warszawa, https://www.knf.gov.pl/poprzednie_lata/dane_statysatyczne/emerytalny?articleId=58902&p_id=18 [access 12.07.2018].

Komisja Nadzoru Finansowego (KNF) (2018b), *Dane ze sprawozdań dotyczące IKZE,* Warszawa, https://www.knf.gov.pl/poprzednie_lata/dane_statystyczne/emerytalny?articleId=58976&p_id=18; [access 12.07.2018].

Komisja Nadzoru Finansowego (KNF) (2018c), *Biuletyn roczny. Rynek PPE 2017*, Warszawa, https://www.knf.gov.pl/publikacje_i_opracowania/dane_statystyczne/emerytalny?articleId=62284&p_id=18 [access 12.07.2018].

Zaremba L. (2003), *Optymalny podział kapitału w funduszach emerytalnych,* Wyższa Szkoła Finansów i Zarządzania w Białymstoku, Białystok.

Skwirowski P. (2018), *Prof. Oręziak: PPK? Wielka iluzja emerytalna. Jak OFE. Ogromne koszty, brak jakichkolwiek gwarancji dla oszczędzających,* „Gazeta Wyborcza", 27.02, http://next.gazeta.pl/next/7,156830,23073805,prof-oreziak-ppk-wielka-iluzja-emerytalna-jak-ofe-ogromne.html [access 12.07.2018].

Szyszka A. (2004), *Czy otwarte fundusze emerytalne mogą być zagrożeniem dla polskiego rynku kapitałowego?,* (in:) Balcerowicz E. (red.), *Problem inwestycji zagranicznych funduszy emerytalnych.*, BRE Bank SA, Centrum Analiz Społeczno-Ekonomicznych, Warszawa.

Zakład Ubezpieczeń Społecznych (ZUS) (2014), *Ważniejsze Informacje z Zakresu Ubezpieczeń Społecznych*, Warszawa.

Analiza proponowanych zmian w polskim systemie ubezpieczeń emerytalnych i porównanie z rozwiązaniami zastosowanymi w systemie kanadyjskim

Streszczenie

System podobny do drugiego filaru kapitałowego w Kanadzie, zwany Pracowniczymi Planami Kapitałowymi – PPK, został niedawno wprowadzony w Polsce. Autor artykułu analizuje, czy wprowadzenie PPK ma w tym momencie sens, przypominając nieudany eksperyment otwartych funduszy emerytalnych z przełomu lat 90. i początku 2000 roku. Koncept PPK przenosi reformę emerytalną do trzeciego trzeci filara, porzucając elementy obowiązkowego powszechnego systemu. Jest on promowany jako program dobrowolny, ale pracodawcy są zmuszeni do uczestnictwa, a wszyscy pracownicy są automatycznie zapisywani, z opcją rezygnacji. Składki są zdefiniowane, ale świadczenia nie. Artykuł porównuje polskie i kanadyjskie systemy emerytalne i proponuje zastosowanie niektórych kanadyjskich rozwiązań, takich jak wyraźny podział na trzy filary systemu zabezpieczenia społecznego.

Słowa kluczowe: fundusze emerytalne, ubezpieczenia socjalne, reforma emerytalna.

Kody JEL: H55

Afiliacja:
Gregory Kaminski, Ph.D.
Health Canada, Healthy Environments and Consumers Safety Branch
269 Laurier Avenue West
Ottawa, Ontario, Canada
e-mail: gregory.kaminski@canada.ca