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## Original Research

# Consumer views on safety of over-the-counter drugs, preferred retailers and information sources in Sweden: after re-regulation of the pharmacy market

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### Abstract

**Background:** The availability of over-the-counter drugs (OTCs) has increased in Sweden since a re-regulation of the pharmacy market in 2009, through which non-pharmacy retailers became permitted to provide certain OTCs.

**Objective:** To examine the adult general public's views on safety, purchasing and information channels, storage and disposal of OTCs in Sweden, three years after the re-regulation of the pharmacy market.

**Methods:** A questionnaire study in 2012-13 in a stratified, random sample of all inhabitants in Sweden  $\geq 18$  years old.

**Results:** Totally 8,302 people (42%) answered the questionnaire. Seven percent found OTCs completely harmless regardless of how they are being used, 18% felt they should be used only on health professionals' recommendation. Differences in how OTCs are perceived were however found with regards to respondents' country of birth, family type, educational level and income. The pharmacy was still the preferred OTC drug retailer by 83% of the respondents and preferred information source by 80%. Reasons for preferred retailers were primarily due to out of habit (45%), counseling provided (35%), the product range (34%) and the confidence in staff (27%). Analgesics are the most common OTCs to have at home (90%). The bathroom cabinet is the primary site for storage (42%) and 16% throw their OTC leftovers in the trash.

**Conclusions:** The study population does not consider OTCs as harmless regardless of how they are used, but on the other hand feels they should not be taken on health professionals' recommendation only. The pharmacy is still the preferred retailer and information source, and there is room for further improvement in the storage and disposal of OTCs. A return of OTC drug leftovers to the pharmacy should be further encouraged. Due to several limitations, great caution should however be observed when generalizing the results to the adult population of Sweden.

### Keywords

Nonprescription Drugs; Health Knowledge, Attitudes, Practice; Community Pharmacy Services; Government Regulation; Patient Safety; Pharmacies; Surveys and Questionnaires; Sweden

## INTRODUCTION

Over-the-counter drugs (OTCs) are commonly used and most people can assume responsibility for using them on their own. We call this "self-care" and define it as "self-medication with over-the-counter drugs (OTCs), intended for use without medical supervision, diagnosis, prescriptions or monitoring of treatment."

The availability of OTCs is increasing, as several prescription drugs are being switched to non-prescription status by the regulatory body, the Swedish Medical Products Agency (MPA), after applications from the manufacturers. The MPA is one of several National Competent Authorities (NPAs), being represented in the European Medicines Agency's

(EMA's) different scientific councils. In Sweden, 42 products have been switched to OTC status since 2003. That is, either a previous prescription substance, strength, dosage form or dose has become available over-the-counter. The availability of OTCs has further increased in Sweden since the Governmental re-regulation of the pharmacy market in 2009, through which outlets other than pharmacies became permitted to provide many OTCs. Non-pharmacy retailers, such as grocery stores and gas stations, wanting to sell OTCs have to send the MPA a notification. Today, they may merchandize 122 different OTCs, comprising 70% of all OTC packages, more than in several other countries in Europe. However, the non-pharmacy retailers usually select a limited stock only of the 10-15 most demanded products. The international trend of increased OTC availability has been questioned for safety reasons, including higher risks for adverse effects in the elderly.<sup>1</sup>

In 2011, two years after the re-regulation, the pharmacy was still the preferred OTC drug retailer in Sweden, according to a Swedish Consumer Agency survey<sup>2</sup>, but purchases in outlets other than pharmacies are increasing. The aspect that was considered most important was whether the OTCs had good quality, followed by advice given by pharmacy staff on the use of various OTC products. Non-prescription medicine use has been examined in several studies<sup>3-12</sup>, including the finding that many consumers need information and advice on the purchase of OTCs and that the most common problem for

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OTC pharmacy customers is uncertainty about the aim of the drug, resulting in an incorrect choice of product.<sup>9,11,12</sup> Other common OTC drug-related problems are therapy failure and adverse reactions, overdoses and drug duplications, contraindications and practical administration issues.<sup>9,11</sup> Studies have also noted a lack of knowledge among the public about OTCs to treat pain and colds.<sup>5,12,13</sup> Because of the increased availability of OTCs and our limited knowledge about the public's use and safety perception of OTCs, the Swedish Medical Products Agency (MPA) decided to conduct a study to increase our knowledge.

The aim of the study was to examine the adult general public's views on risks and safety, preferred purchasing and information channels, reasons for their preferences and storage and disposal of OTCs in Sweden.

## METHODS

A descriptive study in which the survey agency Statistics Sweden (SCB) conducted a questionnaire survey in a web format during November 2012-February 2013 on behalf of the MPA. A paper version of the questionnaire was distributed as well in connection with two reminders. The random selection was drawn from SCB's Total Population Register (TPR).<sup>14</sup>

### Population and sample

The population of interest for the study was the adult general public; that is, registered residents in Sweden, 18 years and older. They constituted a total of 7,630,573 people, from which a stratified, random sample of 20 000 persons was drawn. The stratification was performed to make sure that respondents of the different family types and from the various countries of birth were adequately represented. Study population address information was accessed by the SCB through the TPR.<sup>14</sup>

### Survey design and variables

The MPA phrased the questions and designed the questionnaire in collaboration with the SCB. A validation of the questionnaire was conducted through pilot tests in different groups of the public, followed by revisions. The final version consisted of 22 questions on OTC use, 7 of which are covered in this publication:

- one question containing four different statements on OTC risks and safety with four predefined response options each on to what degree the respondent agreed with the statement
- one question on preferred OTC retailers and one on the reasons for the respondent's preferences, both including a list of different response options
- one question on preferred information sources regarding OTCs with a list of different response options
- one question on the home medicine cabinet, including a list of response options of different OTC groups with examples of products in each group
- two questions on storage and disposal of OTCs, also with different predefined response options.

There was a free text field in each question, where the respondent could add his/her own answer, different from the predefined options.

Additional information about the respondents was acquired through register data from SCB's Longitudinal integration database for health insurance and labor studies (LISA).<sup>15</sup> The following demographic variables were linked to the survey responses:

- a. Gender and Age
- b. Country of birth (Sweden, another Nordic country, Europe, North America, South America, Africa, Asia and Oceania)
- c. Type of family (family units under the Message in coordination issues (MIS) 1999: 1<sup>16</sup> (couples and singles with and without children living at home)
- d. Total earned income in 2010 (per quartile)
- e. Highest education (primary/elementary school, secondary/high school, university/college, or another education).

### Data collection

The SCB sent the study population an introductory letter in November 2012, containing information about both the aim of the study and which background data about the person would be retrieved from SCB's register, along with login instructions to the web questionnaire. Furthermore, the study population was told that only aggregated data would be presented and no single individual could be identified in the results. Three reminders were sent out and the data collection ended in February 2013.

No written consent was used, but by answering the questionnaire the respondents approved that their responses would be supplemented with background data from the SCB. These data linked to the respondents' responses were sent anonymized to the MPA.

### Statistical processing

The respondents differed in terms of demographic variables, such as gender, age and country of birth, in comparison to the general population, as some groups are more prone to answer questionnaires than others. From SCB's previous experiences, the groups most likely to be non-respondents are men, young people and immigrants. To achieve a similar distribution of the demographic variables of interest as in the general population in Sweden, a weight for each responding person was calculated. Some demographic groups would otherwise have been under-represented and the results could have been misleading. The weighting system is frequently used by SCB.<sup>17</sup> The material was analyzed by using the statistical package SAS.<sup>18</sup> Frequencies and cross frequencies were calculated. The results of the outcome variables with respect to gender and age are reported in tables. Larger differences between group response distributions by other demographic variables are presented in the text. All results given are weighted percentages, excluding demographic data in and adjacent to Tables 1 and 2.

Table 1. The distribution of respondents by gender and age (unweighted percentages).

Age	Men	Women	Total
	N (%)	N (%)	N (%)
18-29	424 (5)	643 (8)	1067 (13)
30-39	412 (5)	533 (6)	945 (11)
40-49	513 (6)	889 (11)	1402 (17)
50-59	673 (8)	1014 (12)	1687 (20)
60-69	776 (10)	975 (12)	1751 (21)
>69	686 (8)	764 (9)	1450 (18)
Total	3484 (42)	4818 (58)	8302 (100)

### Ethical approval

The study was approved by the Regional Ethical Review Board in Uppsala Sweden on September 19 2012 with the reference number 2012/331.

### RESULTS

A total of 8,302 people (42%) answered the questionnaire; 57% used the paper survey, 43% the web-based version. Gender and age distributions were as shown in Table 1, while distributions by country of birth, family type and highest education are presented in Table 2.

Regarding income, the respondents were divided into four quartiles. The weighted response rates were highest among women, in the elderly, in respondents born in Sweden or in another Nordic country, in couples without children, in university/college-educated and in respondents with a higher income. Just over 6% of men and 1% of women of the respondents said they did not use OTCs.

### Consumer views on safety of OTC drug use

Seven percent (10% men, 6% women) of the respondents agreed completely or to a large extent with the statement that OTCs are completely harmless regardless of how they are being used, while 71% (68% men, 74% women) agreed to a small extent or not at all (Table 3). The remaining respondents either did not answer the question or marked "No opinion" or "Don't know".

A total of 54% (56% men, 52% women) agreed completely or to a large extent with the statement that OTCs are harmless as long as you follow the directions on the package, while 31% (29% men, 33% women) responded that they agree to a small extent or not at all.

Forty-five percent (42% men, 48% women) agreed completely or largely with the statement that there are risks with OTCs even when you follow the directions on the package, while 34% (35% men, 32% women) agreed to a small extent or not at all with this statement.

Regarding whether OTCs should only be used on doctor's, nurse's or pharmacy staff's recommendation, 18% (18%

Table 2. Distribution of respondents by country of birth, family type and highest education (unweighted percentages).

	Number	%
Country of birth		
Sweden	5116	61.6
Other Nordic country*	1465	17.7
Europe, except the Nordic countries	981	11.8
North America	53	0.6
South America	91	1.1
Africa	98	1.2
Asia	469	5.7
Oceania	8	0.0
Others	21	0.3
Family type		
Couples without children	2842	34.2
Couples with children	1946	23.5
Singles without children	1856	22.4
Singles with children	1613	19.4
Others	45	0.5
Highest education		
Primary/elementary school	1521	18.3
Secondary/high school	2689	32.4
University/college	3208	38.6
Others	421	5.1
Multiple answers	149	1.8
Missing	314	3.8

\*Norway, Denmark, Finland and Iceland

men, 19% women) of the respondents agreed entirely or in large part, while 60% (59% men, 62% women) agreed to a small extent or not at all.

Those in the age group 60 years or older answered the questions about safety and risks of using OTCs to a lesser extent than the others, resulting in a lack of responses from older responders of 17-24% in the various sub-questions. The older age group also marked the response options "No opinion" and "Do not know" more frequently. Thus, they hampered comparisons between age groups, but the distribution of responses within each age group was mostly similar in the different age groups.

Couples with children and single parents totally disagreed with the statement that OTCs are completely harmless irrespective how being used to a greater extent (68% and 64%, respectively) than respondents without children (48% and 57%, respectively). On the other hand, the proportions of couples with children and single parents not agreeing at all with the statement that OTCs should only be used on the pharmacy or healthcare staff's recommendation were larger (50% and 44%, respectively) than among those without children (33% and 39%, respectively).

Differences in the distribution of answers from respondents were also noted with regard to both country of birth and level of education. The proportion who answered that they do not agree at all with the statement that OTCs are completely harmless regardless of how they are used was

Table 3. Consumer views on safety of OTC drug use (weighted percentages).

Statement	agreeing completely or to a large extent	agreeing to a small extent or not at all
OTCs are completely harmless regardless of how they are being used	7	71
OTCs are harmless as long as you follow the directions on the package	54	31
There are risks with OTCs even when you follow the directions on the package	45	34
OTCs should only be used on doctor's, nurse's or pharmacy staff's recommendation	18	60

Four predefined response options: "Agree completely", "Agree to a large extent", "Agree to a small extent" and "Don't agree at all". Row totals < 100%, due to non-responders and those not having expressed any views (that is marked "No opinion" or "Don't know") not included in the table.

Table 4. Motives for consumer preferences for OTC drug retailers by gender and age (Weighted percentages).

Motives for consumer preferences for OTC drug retailers	Men Age (years)			Women Age (years)			Total
	18-39	40-59	60-	18-39	40-59	60-	
Out of habit	47	46	36	53	45	40	45
The counseling	34	34	26	42	40	33	35
The range of products	38	37	21	46	38	17	34
The confidence in the staff	25	28	26	28	28	27	27
The distance to the point of purchase	24	18	17	20	18	15	19
The opening hours	15	15	11	15	16	10	14
The quality of the products	14	12	8	14	12	8	11
The prices	5	4	2	6	4	3	4
The waiting time	2	1	1	1	2	1	1
Other motive	6	5	3	6	6	3	5
No response	6	5	14	2	4	9	6

Predefined response options. Multiple responses possible.

40% in respondents born in Africa and 42% in Asia-born, compared to 62% in study participants born in Sweden. The proportions varied between 48% and 57% in other foreign-born respondents.

The proportion who disagreed with the statement that OTCs are completely harmless regardless of how they are used was largest among those with university/college education (75%) and least among respondents with only primary/elementary education (36%). On the other hand, twice the proportion of respondents with university/college-education (50%) as those with primary/elementary school as their highest education (23%) answered that they do not at all agree with the statement that OTCs should only be used on the doctor's, nurse's or the pharmacy staff's recommendation.

#### Consumer preferences for OTC drug retailers and reasons for their choices

Eighty-three percent (77% men, 84% women) of the respondents usually buy their OTCs at the pharmacy, 8% (11% men, 7% women) in the grocery store or supermarket. Approximately 5% use different places of purchase. Very few (<1%) buy OTCs at the gas station or on the internet. Over 75% of respondents of all age groups buy OTCs at the pharmacy, and 5-15% at the grocery store or supermarket, especially males 18-39 years old (15%).

When asked why they usually choose the specified point of purchase, nearly half of both women and men (43% vs. 47%) answered that their choice was due to habit. For about a third of both men and women, counseling or range of products is the basis for their selection, while trust in the staff is the reason for nearly 30% of both genders (Table 4).

Both men and women 60 years or older listed fewer motives for their selection of OTC drug retailer, which means they marked all the possible options to a lesser extent than younger and middle-aged respondents (Table 4). There was also a greater proportion of the older age group than in the two younger groups who did not answer the question at all. The elderly's most common motive for selecting their OTC drug retailer was out of habit, followed by counseling and trust in the staff.

Different distributions of responses due to other demographic factors were also found. For example, in 18% of couples with children vs 10% in couples without children the opening hours is a motive for the choice of OTC drug retailer. The corresponding proportions in single parents vs. singles without children were 15% and 11% respectively.

In 6% of single parents, price is a reason for their choice of place of purchase. For singles without children, couples with children and couples without children, the proportions were slightly lower (4%, 4% and 3%). Respondents with lower income had stated price as a motive to a greater extent than those with higher income.

#### Consumer preferences for information sources on OTCs

Another question in the survey was "If you are unsure about which OTC you should buy, what would you do?". A total of 80% responded that they ask the staff at the pharmacy (Table 5), with a higher percentage in women (85%) than men (76%). The next most common information source was the package information, but many more women (31%) than men (19%) answered that they read the text on the package.

Table 5. Consumer preferences for information sources on OTCs by gender and age (Weighted percentages).

Consumer preferences for information sources on OTCs	Men Age (years)			Women Age (years)			Total
	18-39	40-59	60-	18-39	40-59	60-	
Pharmacy staff	78	80	68	88	88	77	80
Package information	25	17	14	41	31	17	25
Physicians/healthcare	22	16	13	22	18	14	18
Family/relatives/neighbors/friends	21	11	6	29	9	4	14
Swedish Physician's Desk Reference on the internet	12	10	8	20	17	8	13
Other websites on the internet	22	11	5	22	10	5	13
Health care call center	9	6	3	9	7	3	6
Staff at grocery store or gas station	2	1	1	2	2	1	2
Medicine information call center	1	2	1	2	2	1	1
Other information sources	2	1	1	2	1	0	1
No response	10	12	23	4	6	16	12

Predefined response options. Multiple responses possible.

OTC products usually kept at home by consumers	Proportion keeping at home
Pain relievers, anti-inflammatory and antipyretic drugs	90
Nasal decongestants	55
OTCs used to treat a sore throat or cough	42
OTCs used to treat heartburn and acid reflux	32
Vitamins	28
Skin products	25
OTCs used to treat allergies	25
Predefined response options. Multiple responses possible. Examples of OTC products were listed for each category in the questionnaire.	

Both men and women 60 years or older marked all the possible response options to a lesser extent than younger and middle-aged respondents (Table 5). There was also a larger proportion of the older age group than in the two younger groups who did not answer the question at all.

A majority, 68-88%, of all age groups chose the pharmacy staff as a primary source of information, while reading the package text was the second most common response option, albeit not nearly as frequent (Table 5). Young men and women ask family/relatives/neighbors/ friends, as well as physicians/healthcare, more frequently than middle-aged and older respondents, and furthermore they seek information on websites on the internet to a greater extent.

#### Drugs that the public have at home

More than 93% of the respondents reported that they have one or more OTCs at home and almost 90% usually have OTC pain relievers, anti-inflammatory and antipyretic drugs in their home medicine cabinet (Table 6).

#### Household storage

When asked where to store their OTCs, more than one response option could be marked. The largest proportion of the respondents, 42%, answered that they keep them in the bathroom cabinet, 18% in locked cabinets, 10% in refrigerators, 7% on the nightstand, and 32% elsewhere, such as kitchen cabinet, purse, drawer in the closet, etc.

#### Disposal of OTCs

This question could also be answered by marking more than one option. Just over 50% of the respondents said they turn in their OTC leftovers to the pharmacy. Almost 16% throw them in the trash and one percent said they flush them down the toilet. One percent responded that they leave their remaining OTCs to the healthcare providers. A total of 21% keep them for a possible later need. Almost 18% said that they never have any left. A total of 54% reported that they always or usually check the expiration date of their OTCs, while 12% said that they never do.

## DISCUSSION

To our knowledge, this is the first study conducted in a random sample drawn from the whole adult population of Sweden, aimed at examining consumer views on safety, purchase and information sources of OTC drugs. Half a year after our data collection, another Swedish study was however performed on consumer preferences for OTC drug

retailers and reasons for their choices in a sample of a local web panel.<sup>19</sup>

The public seem to have a sound judgment of OTCs, especially families with children, who could be seen as taking both a more cautious and practical approach towards OTCs. The finding that the proportion of respondents, who think that OTCs should only be used on a health professional's recommendation, declined both with increasing education and rising income, may possibly be interpreted as the highly educated and the high income earners, often the same people, feel they have sufficient knowledge to enable them to take responsibility for their OTC drug use themselves.

Interesting differences were observed between respondents based on country of birth, as those born in Sweden in particular, but also participants born in other Nordic countries and North America, assessed OTCs as harmless to a lesser extent than mainly Africans and Asians. The reasons are unknown, but one explanation could perhaps be that OTCs generally are available under less restriction in Africa and Asia, resulting in a different appraisal. The view of traditional versus western medicine could also have an influence, which may be prominent in many population groups for a long time after emigration.

In an American study, 40% of the respondents said OTC analgesics were too weak to cause damage<sup>7</sup> and two Italian studies reported low awareness and underestimation by the public about the potential risks of long-term use of certain OTCs.<sup>20,21</sup> The results of two other studies in the United States, one of which was a large multicenter study, showed that non-steroidal anti-inflammatory drugs (NSAIDs) are often taken incorrectly and even in a potentially dangerous manner.<sup>22-23</sup> There was also a low public awareness about the potential side effects.<sup>23</sup> In the US multicenter study, self-medication with OTCs was however found to cause hospitalizations due to side effects to a very small extent.<sup>23</sup> Among those that did, NSAID-related stomach/intestinal side effects in the elderly, mainly due to aspirin, were the most common.

Our results confirm the Consumer Agency survey that the pharmacy still is the most preferred OTC drug retailer,<sup>2</sup> although the proportion who buys them at the pharmacy has dropped from about 90 to 80%. In the Swedish web panel study, 76% of the participants had been to a pharmacy the last time they bought any of the OTC drugs listed in the study. According to their results, more respondents aged below 60 than 60 or above had at least once purchased OTC drugs from a non-pharmacy retailer.<sup>19</sup> Pharmacy-monopoly on sales of OTC drugs is still the case

in about half of the countries in Europe, such as in Finland, Germany, Belgium, France, Spain and Italy. Self-care customers in a study in Belgium were happy with pharmacies and hesitant to use other distribution channels of OTCs.<sup>24</sup> In a study in the Netherlands, a country with no pharmacy OTC monopoly, consumers had good confidence in the use of OTCs but still preferred non-prescription analgesics to be available in pharmacies only.<sup>25</sup>

The most common reasons for the choice of OTC drug retailer were much in line with the Consumer Agency's survey.<sup>2</sup> The Swedish web panel study arrived at different results, where geographic proximity was reported as the overarching factor in the choice of retailer, followed by opening hours and range of available products, while access to counselling by trained staff was rated as the fourth most important reason.<sup>19</sup> Our finding that opening hours was a more common motive for families with children could probably be explained by the fact that availability is a major practical issue for the families with children. Nor was it surprising that the price of the OTC was an important reason for single parents when selecting the place of purchase, considering their economic conditions. Also as expected, the price motive declined with rising income.

The pharmacy staff was the most common information source prior to choosing the product when being uncertain, which is in accordance with a study in Northern Ireland, where the pharmacist's recommendation had the greatest influence on the consumers' product selection.<sup>26</sup> In an interview study in pharmacies in Estonia, more than half of the respondents relied on the pharmacist as a drug counselor and appreciated the recommendations on OTCs.<sup>27</sup> However, in a Swedish interview study of a thousand OTC analgesics/NSAID pharmacy customers, over 90% said that they select their products without any communication with the pharmacy staff other than for payment. Furthermore, 8 out of 10 responded that they routinely chose the same OTC product as previously purchased. In the same study, 40% reported that they did not intend to read the package insert.<sup>12</sup> As opposed to our current study, the previous study however dealt with OTC analgesics and NSAIDs only and the respondents obviously felt confident in their product selection and therefore did not seek any advice. It may seem surprising that only 18% preferred physicians as a source of information. One plausible explanation is the easier access to pharmacists' counseling, another that it may feel more natural to ask for advice at the moment of OTC purchase than to ask at a doctor's appointment.

The finding that young people in our study ask both family and doctors to a greater extent than middle-aged and older people could possibly be because they still have limited experience in OTC use. It is not surprising that they also seek information on various websites to a higher degree, given that they have a greater habit than older people of using the internet. The fact that even low-income people in the study to a larger extent use the same sources of information as the young, may be because they are partly the same people, i.e., younger who have not yet reached a higher income, and that several of these information sources are free of charge. The reason why it was more

common among respondents born outside the Nordic countries to turn to doctors/health care could possibly be a cultural issue.

It was expected that analgesics and various cold remedies, followed by OTCs to treat dyspepsia, would be common in the home medicine cabinet. In one of the studies in Northern Ireland, analgesics were clearly the most common OTCs found in the home, followed by vitamins and minerals and products for dyspepsia.<sup>26</sup> In the Dutch study mentioned earlier, over 80% used OTCs in the past year, virtually all analgesics/antipyretics and three quarters cold medications.<sup>25</sup> Analgesics and antipyretics represented 76% of the OTC drugs used in the Swedish web panel study, followed by nasal sprays for cold relief (35%) and antacids and anti-reflux drugs (18%).<sup>19</sup>

The finding that almost half of the respondents in our study said that they used the bathroom cabinet for storage purposes, pointed to a need to inform about the unsuitability of such storage given some drugs' moisture sensitivity. It is surprising that 17% of respondents throw their OTC leftovers in the trash or flush them down the toilet, considering both that pharmacies have propagated for decades a return of unused OTCs to the pharmacy and the general increase in environmental awareness in society. However, according to a systematic review, covering the literature on medication disposal around the world in 2005 through 2015, Sweden and Germany were the only countries where returning drugs to pharmacy was practiced to a larger extent. According to the review, the most common method for disposal of unused medications in households is disposal in the garbage.<sup>28</sup> Hence, the practice of medication disposal in Sweden may still be good in an international comparison.

A limitation of our study is the low response rate, but due to both the stratification sampling and the weighting procedure the distribution of demographic variables of the study population is believed to be similar to the adult population in Sweden. As it however is not known how representative the reported consumer views on safety and preferred drug retailers and information sources are, the questionnaire results should be generalized to the adult population of Sweden with great caution. Although, possible reasons for differences among different groups of respondents are discussed, chi square tests would not have been sufficient to establish causal relationships but a more thorough statistical analysis would have been necessary. A limitation that made age-related comparisons more difficult was the finding that the older age group marked the response options "No opinion" and "Do not know" more frequently than the younger respondents, as well as generally fewer options in questions where multiple responses were possible. The reasons are unknown, but it is not likely to be due to the web-based survey medium, as they had the possibility to choose the paper-based format instead. One possible explanation could be that some people think of "OTC drugs" as a heterogeneous collective term for products which are more or less safe to use. The answers might therefore depend on the product in question and respondents may have found it hard to generalize to OTCs as a whole.

Like in questionnaire studies in general, there is also a risk of a selection bias through which the most interested respond. Additionally, there is a possibility of both a recall and a social desirability bias, the latter perhaps reinforced by the fact that the study was run by the regulatory authority. Another limitation is the fact that the data collection took place three years after OTCs were permitted to be sold by non-pharmacy retailers and changes may have taken place during the more than three years that have passed since the data collection, such as an increase in e-commerce. Hence, the results are limited to the point in time when the questionnaires were answered

Despite the limitations and the cautious generalization of the results to the adult population of Sweden, the findings may be of value for future research, such as in generating hypotheses.

## CONCLUSIONS

In conclusion, the study population does not consider OTC drugs to be harmless regardless of how they are used, but on the other hand feels they should not be taken on health professionals' recommendation only. The majority buys

OTCs at the pharmacy and close to all have OTC drugs at home, most frequent of which are drugs to treat pain and fever. Pharmacy staff is the most common sources for advice on OTC use and a quarter say they read the package information. The storage and disposal of OTCs can be further improved.

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## CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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