Handbook

Communication Strategies for Sharpening Environmental Awareness in the Handling of Pharmaceutical Drugs

German Federal Environmental Agency
Research Project 37 08 61 400

Umwelt Bundes Amt
For our Environment

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Contents

List of figures

Summary

In Germany, as in almost all industrial countries, active pharmaceutical substances can now be found in virtually all water bodies and occasionally also in drinking water. Even though the concentrations in question tend to be very low, there are initial signs of their impact on aquatic life. There is no evidence as yet of any acute consequences for human health. It is, however, impossible to rule out long-term consequences from these minimal concentrations or unexpected effects from the interaction between various active ingredients (cocktail effect). At special risk here are sensitive segments of the population such as children and the chronically ill. There is thus a need for action on precautionary grounds.

The main actors in the health system are largely unaware of the problem posed by drug residues in water. Although knowledge cannot be equated with awareness – given the existence of the 'not wanting to know' phenomenon – the first step is to generate a consolidated knowledge base. Only by creating awareness of the problem can further strategies be implemented to ultimately enlighten and bring about behavioural change. At stake here is the overall everyday handling of medications, including prescription, compliance, and drug-free disease prevention down to the doctor-patient relationship. The latter, namely, is often characterised by misunderstandings and a lack of communication about the – supposed – need to prescribe drugs.

The first part of the strategy for the general public involves using various channels and media to address three different target groups. These were identified by ISOE in an empirical survey as reacting differently to the problem under review:

- 'The Deniers/Relativists'
- 'The Truth-Seekers'
- 'The Hypersensitives'

The intention is to address each target group in the right tone and using the most suitable line of reasoning via specific media and with the proper degree of differentiation. The 'Truth-Seekers' play an opinion-leading role here. They can be provided with highly differentiated information through sophisticated media which they then pass on to their dialogue partners in an appropriate form.

The second part of the strategy for the general public relates to the communication of proper disposal routes for expired drugs. The goal is to confine disposal to pharmacies so that on no account are they flushed down the sink or toilet. Based on an analysis of typical errors in existing communications media on this topic, ISOE prepared recommendations for drafting proper information materials.

In addressing pharmacists, the first priority is to convey hard facts: to this end we propose a PR campaign to place articles in the main specialist media. At the same time, the subject should feature in training and continuing education programmes. Another aim is to strengthen the advisory function of the pharmacies. The environmentally sensitive target group would indeed react positively to having their attention drawn to the issue of drug residues in water. For all other customers, the pharmacists can and should act as consultants: they emphasise how important it is to take medication as instructed (compliance) and

use suitable pack sizes, and warn older customers in particular about the potential hazards of improper drug intake.

The first stage of the communications strategy for doctors likewise revolves around knowledge. Here, however, it is important to take into account their self-image as scientists while in fact having little grasp of this specific area. The line to take is that of 'discursive self-enlightenment'. This means that the issue of drug residues in water cannot be conveyed to doctors by laymen but must be taken up and imparted via the major media of the medical profession and by medical association officials (top-down).

The second stage, namely that of raising doctors' awareness of the problem, is likely to encounter strong resistance from some of the medical profession. They may fear a threat of interference in treatment plans from an environmental perspective and feel the need to emphasise that doctors are not responsible for environmental issues. As shown in empirical surveys by ISOE, such a defensive reaction is ultimately down to an underlying taboo: people are loath to discuss the over-prescription taking place in countless doctors' surgeries. And it is a fact that this problem cannot be tackled from the environmental perspective, although the goals of water protection are indeed consistent with the economic objectives of restraint in the deployment of drugs. Any communications measure for this target group has to bear in mind that doctors feel restricted by what they see as a 'perpetual health reform' no matter which government is in power. On no account are they prepared to tolerate any new form of regulation, in this case for environmental reasons.

An entirely different view of the problem is taken by 'critical doctors' such as specialists in environmental health and those with a naturopathic focus. They are interested in the problem because they see a connection between the quality of our environment and our health. What is more, they have patients keen to be prescribed as few drugs as possible and who are instead interested in 'talking medicine'. So, any communication strategy intent on tackling the difficult problem of oversubscribing drugs needs to look carefully at the experiences of these medical professionals and also at a 'bottom-up strategy'.

Implementation of strategic communications should be entrusted to an agency with experience in 'issue management'. Knowledge of social marketing and the influencing of behaviour are further prerequisites. All important decisions should be taken by a consensus committee ('MeriWa'[1] round table), in which the medical profession, pharmacists and consumers are represented.

[1] MeriWa = Medikamentenreste im Wasser; drug residues in water

Preliminary comments

In order to reduce drug residues in the environment, an awareness of the problem needs to be promoted amongst those responsible in the health system and amongst the population. The will to take sustainable action must also be strengthened. In this handbook, we therefore present communication strategies designed to help prevent environmental risks in the handling of pharmaceuticals. These preventative measures concern the overall handling of medications, from prescription through usage down to disposal. The German Federal Environment Agency or other institutions can only raise awareness and bring about changes in behaviour within this field by addressing the major players in the health system.

These include doctors, pharmacists and users of pharmaceutical drugs. Appropriate measures of communication are required to suitably address each of these target groups. As we have seen from the results of various empirical surveys, the general public knows virtually nothing about the problem. There is also a risk of individual aspects being misunderstood, dramatized or vehemently repelled.

This is why forward-looking strategic communication with elements that interlink and build on each other makes sense. Communication of this kind is referred to as 'issue management'. The handbook presents communication strategies which are geared to the above-mentioned target groups and designed to promote the sustainable handling of pharmaceuticals. Special attention is given here to the fact that, to some extent, the motivation to undertake preventative action has to be drawn from what is only a vague grasp of the facts. This places special demands on communication.

The handbook consists of four sections:

1. Background information on the state of research and the legislative framework
2. Basic information on risk awareness
3. Recommendations on how to draft communication material explaining how to dispose of expired drugs
4. The centrepiece of the handbook: recommendations outlining the specific strategies for the general public, doctors, pharmacists and hospitals

The handbook is primarily directed at the staff of the German Federal Environment Agency working in specialist departments such as Wastewater, Disposal, Chemical Risk Assessment, and Communications. It may, however, also be used by all interested parties in the umbrella organisations of doctors and pharmacists as well as by health insurance companies and consumer advice bureaus.

1 Background and problem definition

Pharmaceutical drugs are for many people an indispensable part of a healthy life free of complaints. However, the early 1990s saw the somewhat incidental discovery in Berlin's drinking water sources of what was at the time a commonly used drug for reducing blood lipid levels. The downside of using pharmaceutical drugs became very apparent: following drug intake, the active ingredients and their metabolites are for the most part excreted with the urine and end up in the water cycle. Our sewage plants are not as yet capable of fully eliminating these substances. Trace concentrations of active pharmaceutical ingredients are thus now ubiquitous in the aquatic environment: numerous studies describe over 100 different substances in almost all of Germany's surface waters, in groundwater influenced by such surface waters, and occasionally even in drinking water. There are circa 3,000 active ingredients available on the German market alone. The only reason why a mere fraction of these have been found in the environment is due above all to the lack of specific methods for detecting what are generally highly complex molecules.

Given these findings, the environmental relevance of pharmaceutical drugs in the water cycle is today undisputed. The degree and nature of the risk to the environment or to human beings does, however, remain unclear. The main reason for the on-going debate is the high degree of scientific uncertainty about possible hazards for the environment or humans. So far, the only certainty is deemed to be that individual active ingredients are capable of impacting negatively on aquatic life. On the other hand, as far as we are currently aware, acute risks to human health from polluted drinking water can virtually be ruled out. Nonetheless, the nagging question still remains as to the chronic effects that may arise from a lifelong intake of active drug ingredients, albeit in sub-therapeutic doses.

Pitted against these uncertainties in scientific risk assessment are two certainties in the way societies approach the problem. On the one hand, drug residues in water bodies are undesirable – and still more so in drinking water. As basis for life itself and as the most essential of all foods, water is not only of factual but also of strong symbolic significance. People do not want drug residues in their drinking water, regardless of whether they represent a proven health risk or not. On the other hand, individuals and society as a whole associate pharmaceutical drugs with considerable benefits – at least in the case of human therapeutics. In case of doubt, this means that based on ethical considerations, if nothing else, health protection is always likely to take precedence over environmental protection.

At the European level, this deliberative stance is reflected in the current laws for market authorisation of human therapeutics. Legislation allows effective risk-mitigation measures only within a tightly restricted framework. To sustainability strengthen risk prevention, it is therefore necessary to identify and implement measures (also those beyond the legislative approach) that are capable of effectively reducing the entry of active pharmaceutical ingredients into the environment. These include the development of innovative active pharmaceutical ingredients with a better environmental performance, along with more advanced technical measures to protect water bodies. Another key sphere of action is the actual handling of drugs themselves, i.e. the way they are prescribed, sold, used and disposed of.

A modified approach to handling pharmaceutical drugs holds great potential for strengthening risk prevention (cf. ISOE 2009; *start* 2008; Keil 2009). However, to activate this potential it is necessary to fully inform important actors within the health system and make them aware of the problem. This calls for target-group-specific communication measures that reach out to the medical profession, pharmacists and users of pharmaceutical drugs, respectively.

This handbook presents communication strategies that have been tailored to these target groups with the intention of promoting sustainable handling of pharmaceuticals. Special consideration has been given to the fact that the motivation to act rests on a somewhat shaky knowledge base. This difficult situation places special demands on communication.

1.1 The environmental relevance of pharmaceuticals for human use: an overview

The occurrence of active pharmaceutical ingredients in the environment is largely a side-effect of their intended use. In order for the substances to work properly, they must manifest a minimum degree of stability. A sufficient number of intact drug molecules must reach the diseased cell before being broken down into various metabolites by the biochemical processes taking place in the body. Active substances are generally optimised to achieve the required stability and this has two consequences. On the one hand, the active ingredients do not fully metabolise in the body and, instead, are predominantly excreted via the urine, in some cases in an unmodified state. In this way they end up in domestic sewage. On the other hand, the desired stability of the molecules prevents their biological degradation in our sewage plants (which are based on the activated sludge system): elimination rates of between zero and 100 per cent are observed, depending on the active ingredient at stake (cf. Ternes et al. 2004, 2005). On being released into the rivers and lakes with the discharge from sewage plants, the stable molecules then can find their way into the groundwater and ultimately back to human beings via the drinking water.

These diffuse inputs via domestic sewage represent the main source of active pharmaceutical ingredients in the environment. In contrast to this, pharmaceutical production plants, hospitals and other medical facilities (e.g. nursing homes) are considered point sources. Whereas polluted industrial effluents play a secondary role, at least in Europe (cf. Larsson et al. 2007; Thomas et al. 2007), current studies put the contribution of hospitals towards the overall annual volume released into the environment at 10 to 20 per cent (Feldmann et al. 2008; Schuster et al. 2008; Alder et al. 2006). Another source of input on top of those named is improper disposal of expired drugs via the toilet or wash basin/sink. Figure 1 illustrates the materials cycle.

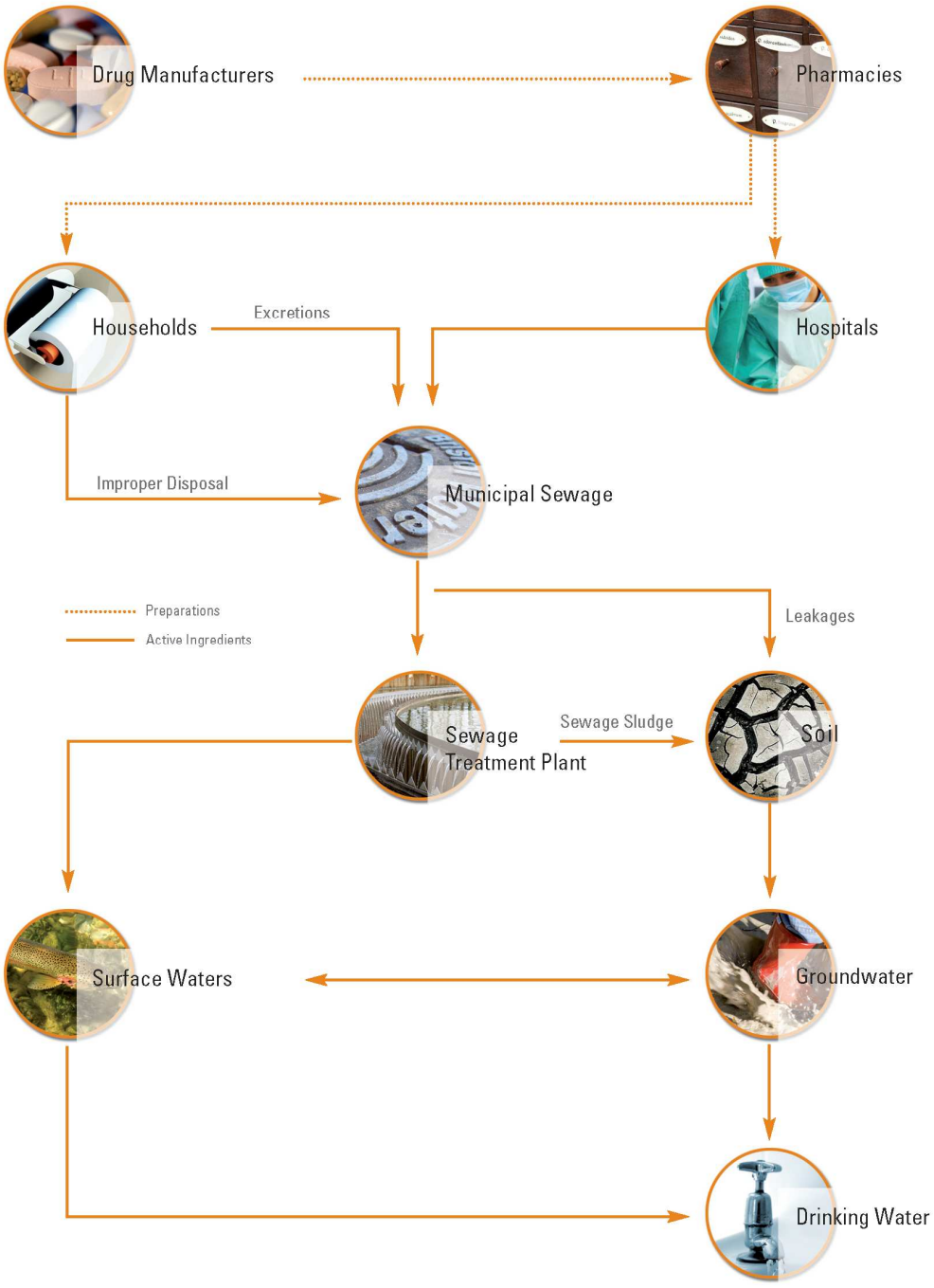

Fig. 1: Input paths of active ingredients from pharmaceuticals for human use entering the environment (*start* 2008: 14)

1.1.1 Occurrence of active pharmaceutical ingredients in the environment

The current state of knowledge on the occurrence of pharmaceuticals in the environment has been extensively documented in a large number of publications (see for example Kümmerer 2008; LANUV NRW 2007; German Council of Environmental Experts 2007; Schulte-Oehlmann et al. 2007). The following therefore assembles merely those facts crucial to gaining an insight into the problem.

In Germany there is only limited availability of consumption figures for pharmaceuticals as manufacturers are not obliged to publish their production volume. The health insurance companies have access to data on annual prescription rates; nonetheless, these figures do not reflect the non-prescription drug (OTC) market which is also experiencing growth due to internet trade. The data available at present dates from 1996–2001 and was published by the German Federal Environment Agency on the basis of data from the Institute of Medical Statistics (IMS Health AG). According to this data, a total of 38,000 tons of pharmaceuticals was dispensed by pharmacies and hospitals in 2001 (UBA 2005). This volume was spread over 2,671 different active ingredients. The data showed painkillers (analgesics) and anti-inflammatories to be amongst the active substance groups with the highest sales figures (ca. 2,500 tons), followed by antibiotics (approx. 500 tons), anticonvulsants (approx. 200 tons) and medication to reduce blood pressure (antihypertensives, beta-receptor blockers, approx. 150 tons).

Where large quantities of an active ingredient are consumed, it is an indicator of the substance's widespread presence in the environment. Correspondingly, the occurrence in the environment of pain-relieving and anti-inflammatory agents such as diclofenac and ibuprofen, antibiotics such as roxythromycine and sulphamethoxazole, anticonvulsants such as carbamazepine and primidone, and hypertensives such as metoprolole and sotalole has been proved particularly frequently. Added to this is another group of substances that are not strictly speaking pharmaceuticals but belong to the so-called diagnostics such as x-ray contrast agents like iopromide or amidotrizoic acid. On average, the concentrations measured lie between a few billionths to several millionths of a gram per litre (nano or micrograms per litre). Similar findings exist internationally for most of the industrialised countries.

The concentrations of active ingredients in rivers and lakes are normally far higher than in groundwater (cf. BLAC 2003). This is due to the fact that the substances in surface waters strongly degrade before reaching aquifers: biologically via microorganisms and photochemically via solar radiation. Furthermore, they can become adsorbed to suspended matter and particles. The following table gives examples of environmentally relevant data for selected active pharmaceutical ingredients. These are the maximum values based on single measurements.

Active ingredient	Indication group	Consumption (2001) in kg	Maximum concentrations in µg/l		
			Surface water	Groundwater	Drinking water
Amidotri-zoic acid	x-ray contrast agents	60,700	0.950	0.650	0.085
Carbamazepine	Anticonvulsants	87,600	1.810	0.110	0.030
Cyclophosphamide	Cytostatics	385	0.100	**	0.008
Diclofenac	Antirheumatics	85,800	2.000	0.030	0.001
Ethinyl-estradiole	Hormone	50	0.005	0.002	0.023
Ibuprofen	Antirheumatics	344,880	1.500	0.510	0.003
Ifosfamide	Cytostatics	170	0.180	**	No findings
Iopromide	Radiocontrast agents	64,100	8.5	0.22	0.086
Metoprololl	Anti-hypertensives	93,000	1.800	0.030	No findings
Primidone	Anticonvulsants	10,000	0.560	No findings	No findings
Roxythromycine	Antibiotics	9,550	0.060	0.026	No findings
Sotalole	Antihyper-tensives	26,600	0.850	0.560	No findings
Sulphamethoxazole	Antibiotics	53,600	0.380	0,030	No findings

Table: Data on the occurrence of active pharmaceutical ingredients in the aquatic environment (non-representative single measurements) (below the detection limit; sources: BLAC 2003; LANUV NRW 2007 and bibliographical references therein)**

If a certain active ingredient is not found in the environment, this may essentially be due to the following: either there is no specific technique to prove its existence or it is degraded in the human body to such an extent that mainly metabolites rather than the original substance are excreted. Since the structure of these metabolites is generally unknown, they normally escape the search lights of an environmental analysis. For a comprehensive risk assessment, transformation products of this kind are of special importance since virtually nothing is known about their toxicological properties. It is not only metabolites that are at stake here but also some unknown products which occur during the course of natural degradation processes or in technical wastewater treatment and drinking water processing.

1.1.2 Occurrence of pharmaceutical active ingredients in drinking water

Two thirds of Germany's drinking water is sourced from groundwater. The rest comes from surface waters (rivers, lakes or reservoirs), bank filtration and enriched groundwater. Bank filtrate is a mixture of groundwater and river water extracted via wells close to the banks of rivers or lakes. Enriched groundwater is obtained via artificial means by percolating surface waters (generally pre-purified river water or treated wastewater) through appropriate springs or ponds. In both cases, passage through the soil leads to at least partial degradation of pollutants. Surface waters and bank filtrate are generally far more polluted with pharmaceutical drug residues than groundwater. This poses something of a risk for waterworks, which extract water from both these raw water sources, in that the drinking water could also contain traces of active substances. In Germany, however, many of these water-

works deploy activated carbon filtration (often coupled with ozonation) for the treatment of drinking water. With the exception of a few x-ray contrast agents, the procedure has proved effective in removing active pharmaceutical ingredients and other micropollutants (Ternes et al. 2005).

In actual fact, the occurrence of active pharmaceutical ingredients in German drinking water samples has so far only been proven in isolated cases. A current review of the literature (LANUV NRW 2007) substantiates the occurrence so far of 15 different active pharmaceutical ingredients in drinking water (cf. also Table above). As to be expected, the concentrations measured, amounting to a few billionths of a gram per litre (a few nanograms), are far lower than those in surface water or groundwater.

1.1.3 Potential risk for humans and the environment

Very little is yet known about the possible risks to the environment posed by pharmaceutical drug residues. Ecotoxicological studies are only available for a few substances. The reason for this is not just the vast array of substances but above all the fact that significant results can only be achieved through long-term studies. However, the ascertainment of chronic effects in such studies calls for considerable investment in terms of time and money. Most of the active pharmaceutical ingredients investigated to date are only acutely toxic for aquatic life in concentrations that far exceed current values measured in water bodies (for an overview of the current status of ecotoxicological knowledge cf. German Advisory Council on the Environmental 2007; LANUV NRW 2007).

One example, however, shows that even the concentrations typically found in water bodies may pose a risk for aquatic life: the active ingredient 17α-ethinylestradiol (EE2) is deployed in most hormonal contraceptives and occurs in the aquatic environment in concentrations of a few nanograms per litre (see Table). It has been shown that, due to its high oestrogenic potency, EE2 is a substantial contributor to the feminisation of male fish in habitats close to sewage treatment plant outlets (Jobling et al. 1998). Given the current state of knowledge, it is impossible to rule out particularly sensitive reactions to a certain active substance in the proven concentrations by other animal species or plants. This is shown by the much discussed example of the anti-inflammatory 'diclofenac', which in Pakistan and India led to the near-total extinction of three types of vulture (Oaks et al. 2004). They had fed on the carcases of cattle that had previously been treated with the drug.

In terms of human health toxicity, active pharmaceutical ingredients are amongst the most stringently tested substances. During the drug licensing process, an active ingredient is tested not just for its therapeutic efficacy but also for a variety of undesirable side-effects to patients.[2] The overwhelming expert view is that the incidence of such side-effects and a potential threat to health through consumption of contaminated drinking water may be largely ruled out (Webb et al. 2003). This can be illustrated using a simple piece of arithmetic. It was possible to identify the above-mentioned active ingredient 'carbamazepine', de-

[2] Here it is important to take into account that any testing for side-effekcts tends not to be undertaken for those groups at highest risk such as children, the critically ill, or older people.

ployed in anticonvulsants and antidepressants, in individual drinking water samples in maximum concentrations of 30 nanograms per litre (cf. Table). If they consumed two litres of water a day over a 70-year life span, a human being would only ingest a few thousandths of the recommended daily dose of the drug (around 600 milligrams).

1.1.4 Fundamental problems of risk assessment

Risk assessment based solely on a comparison with therapeutic doses does, however, only cover part of the potential risk. It fails to take into account possible unknown effects of micro doses. For example, the possible chronic effects of ingesting sub-therapeutic doses of active ingredients throughout a lifetime remain largely unexplored. The possible effects from substance mixtures is likewise unexplored. The risk assessment of chemicals generally involves evaluation of individual substances. In the environment, however, living things are simultaneously exposed to many substances. According to current knowledge, the effects of the individual substances accumulate in as far as they manifest the same mechanism of action (cf. Kortenkamp 2007; Sumpter et al. 2006). Exactly how such 'cocktail effects' can be adequately accounted for in risk assessment so far remains unclear. Risk assessment is further complicated by the numerous degradation products from pharmaceutical ingredients which originate in the human body, sewage plants or water bodies. Virtually nothing is known about their toxicological properties.

1.2 Current European legislation

1.2.1 Drug authorisation procedures

An environmental risk assessment (ERA) for the authorisation of new human therapeutics in Europe was made obligatory as early as 1993 (Directive 93/39/EG). This directive has also been applicable to generics since 2004 (Directive 2004/27/EG on amending the Community Code 2001/83/EG). Pharmaceuticals approved before this directive came into effect do not need to undergo a retrospective ERA. However, as of 1.12.2006, there is a uniform technical standard for the ERA in place which has to be initiated by the drug manufacturer. It takes the form of a guideline for the ERA itself, drawn up by the European Medicines Agency (EMA). It is used both for Europe-wide and for national drug authorisation. In Germany, the Federal Environment Agency in collaboration with the Federal Institute for Drugs and Medical Devices (BfArM) is carrying out the ERA. Since the guideline has only been available since the end of 2006, very few active pharmaceutical ingredients have so far been tested according to these regulations during the authorisation procedure.

Directive 2004/27/EG defines two types of risk that may accompany the use of a pharmaceutical drug. On the one hand there are risks to public health or the health of patients relating to the quality, safety and efficacy of a drug. On the other hand, undesirable effects on the environment are also seen as risks. Of crucial importance here: the environmental risks are not part of the decisive risk-benefit analysis for authorizing a drug. This means that even if an environmental risk is ascertained during the ERA, it is not possible to expressly refuse authorisation of the drug. In such a case, the only course of action available is to request preventative measures. However, the actual options open to the authorities

responsible are currently very restricted in this respect. In practice, they are confined to including in the package leaflet and in specialist information for doctors and pharmacists a reference to the need for proper disposal of unused drugs. The legal situation is different for veterinary pharmaceuticals: here, authorisation may be refused or made subject to certain conditions if an environmental risk is assessed (Directive 2004/28/EC on amending the Community Index 2001/82/EC).

1.2.2 Protection of drinking water and water bodies

At present, there are no binding thresholds for active pharmaceutical ingredients in surface waters and groundwater, neither at European level nor in Germany. In principle, however, it is indeed legally possible to set such thresholds, for instance in the European Water Framework Directive. Nor have any European thresholds for active pharmaceutical ingredients so far been set for drinking water (in the Drinking Water Directive 98/83/EG), whether for human-use or veterinary drugs. To date, the German Directive on the Quality of Water for Human Consumption does not define any binding limit values for active pharmaceutical ingredients. For these and other as yet non-evaluated substances, the German Drinking Water Commission merely recommends a precautionary limit of 0.1 microgram per litre –a threshold that, however, is non-binding and toxicologically unsubstantiated.

1.2.3 Disposal of expired pharmaceuticals

Apart from a few exceptions such as cytostatics, medications are not legally classified as hazardous waste (cf. Directive for Implementation of the European Waste Catalogue of 10.12.2001, BGBl. I S. 3379). For this reason it is basically legitimate to dispose of expired or unused drugs along with household waste. From an environmental perspective, this can be seen as unproblematic, since according to the Technical Directive on Urban Waste dating from 1993 (Federal Gazette No. 99a from 29.5.1993), all urban waste have to undergo pre-treatment as of 1.6.2005. This means almost entirely thermal energy recovery in waste incineration plants. This is likely to have greatly reduced the risk of future groundwater pollution from active pharmaceutical ingredients in landfill leachate.

Directive 2004/27/EG[3] provides for the setting up of collection systems for unused or expired pharmaceutical drugs in order to guarantee proper disposal of the substances (Article 127b). All member states were required to make such systems available by October 2005. In Germany a system by which pharmacies took back expired drugs was installed. The intention with this system was that manufacturers of pharmaceutical drugs and other medical products should honour their obligations as per the Packaging Ordinance for the Recycling of Valuable Substances (e.g cardboard and paper from pharmaceutical packaging). It is in fact a special solution for the sector, which was not part of the 'dual system' regulation. According to the main operator of the take-back system – VfW Remedica – a good three quarters of all pharmacies in Germany participated in the scheme in 2008.

[3] Directive 2004/27/EC of the European Parliament and of the Council amending Directive 2001/83/EC on the Community code relating to medicinal products for human.

Subsequent to the fifth amendment to the Packaging Ordinance which came into effect on 1 January 2009, all packaging must today be registered and licensed with 'Duales System'. This does away with the exemption of expired drugs and their repackaging, on which the take-back system was based. According to VfW Remedica, under the new regulations, the cost of disposing of expired pharmaceutical drugs can no longer be generated, as now the drug manufacturers pay Duales System directly instead of VfW Remedica. As a result, the latter initially halted disposal of expired drugs as of 1 June 2009.

The question as to how Germany will organise the disposal of expired drugs in future currently remains unresolved. In negotiations between the pharmaceutical industry, pharmacy associations and VfW Remedica, a fee-paying system for pharmacies is now emerging (status as of February 2010). It is not yet possible to predict whether this means that the safest option and the one favoured by the Federal Agency for the Environment and others (cf. *start* 2008, namely that of returning expired drugs via the pharmacy) can be maintained.

1.2.4 The role of the precautionary principle

The precautionary principle enjoys special significance when it comes to 'pharmaceuticals in the environment'. The precautionary principle has been one of the most important legal tenets in European environmental legislation since the Maastricht treaties of 1992 (Treaty on European Union, 92/C 191/01, Article 174). It legitimises decisions and the measures based on them, even in cases where something is known to have potentially harmful effects on humans and the environment but the risk cannot be scientifically proven with sufficient certainty (European Commission 2000). Put another way: without knowing for certain the likelihood and extent of possible damage, the aim is to avoid it from the outset.

This is the case when it comes to possible risks for the environment or human beings from active pharmaceutical ingredients in the water cycle. In order to ascertain a risk, it is necessary to establish a relationship between a cause and any harmful impact observed. In risk assessment for chemicals in general and for active pharmaceutical ingredients in particular, however, there are only rare cases where this is possible. The reasons for this are essentially two-fold. On the one hand the range of substances is vast. This means that negative impacts can not necessarily be traced back to one in particular. The effects can also be triggered by the combined and simultaneous impact of several substances. On the other hand, there may be long periods between a cause and evidence of its impact. It is extremely difficult to ascertain by scientific methods a causal relationship in chronic reactions of this kind.

The precautionary principle is based on the normative requirement to create room for manoeuvre and safety margins, even for risks possibly emerging as such sometime in the future as opposed to the here and now (Calliess 2006; von Schomberg 2005). The regulations currently in place for the EU – particularly the mandatory ERA when authorizing a new active pharmaceutical ingredient – are to be viewed in the context of the precautionary principle.

As shown in empirical studies (cf. Ch. 4.2 Population-specific Strategy), it is particularly important to refer to the precautionary principle when designing communication strategies for the sustainable handling of pharmaceutical drugs. Given the uncertainties involved in

assessing the risks, the main difficulty with concrete preventative measures is, however, to guarantee commensurability (Keil 2008). It is also vital to avoid any conflict of aims between the individual actors. For the issue 'Pharmaceuticals in the environment' this means that preventative measures' at the de facto and communication level must not be allowed to detract in any way from the quality of medical care.

2 Risk awareness in society

What features and characteristics determine the degree to which a risk is perceived as threat by individuals and by society? Are different types of risk perceived in different ways? The following brief outline provides an insight into the theory behind risk perception to allow a better understanding of risks and the importance of adapted, target-group-specific risk communication. These basic principles should enable better appreciation of target group characteristics when developing risk communication (cf. Population-specific Strategy).

2.1 Fundamentals of risk perception

Exactly how a risk is perceived does of course depend on the risk itself, but subjective and social factors also play a role. *Flight, fighting, feigning death, and inquisitive experimentation* (Renn et al. 2007) are considered evolutionary responses to danger, i.e. developed over the course of human evolution. As society developed, further graduations of such (somewhat archaically rooted) responses emerged and became part of cultural and social assessment. Psychologically measurable characteristics that influence individual risk perception and are subject to these cultural evaluations are referred to as psychometric traits (Jungermann/Slovic 1993; Zwick/Renn 2002). They include aspects such as the personal benefit arising from the desired effects of the risk source. Take, for instance, mobile communications, with mobile reachability on the one hand and the possible exposure to radiation on the other. What counts when subjectively assessing a risk is whether people are putting themselves at risk voluntarily, how much they know about the risk, and to what degree they can influence it. Another crucial factor is whether the risks and rewards are fairly distributed in society. This reflects the important fact that sections of society are indeed prepared to bear certain risks as long as the reward is high enough and the risk not unfairly distributed, and providing they can personally influence the risk to themselves.

The subjective rating of a risk also depends on the *characteristics of the risk source*. These include (according to: Renn et al. 2007: 78; Jungermann/Slovic 1993)

- the degree to which people become accustomed to the source of risk,
- the potential for catastrophe inherent in the risk source,
- the probability of fatal consequences should a risk actually materialise,
- undesirable consequences for the next generations,
- a sensory perception of the danger in question,
- the sense of being able to reverse the consequences of a risk.

Depending on their characteristics, risks are perceived within so-called mental pigeonholes, namely as a direct threat, a stroke of fate, a challenge to personal resources, a gamble, or an early warning of slow-onset hazards. These ‘mental pigeonholes’ are systematically linked with risks of different types (cf. Renn et al. 2007: 80ff.). Examples are technical risks (e.g. nuclear power plants) as an immediate threat, natural catastrophes as a stroke of fate, risks associated with sport or financial investment as a challenge on personal resources, and BSE, genetically modified products, or radiation from mobile communications as slow-onset hazards.

2.2 Target-group specific perception

With typological differentiation it is possible to ascertain how the different social groups perceive risk. Empirical studies (for mobile communications example: Büllingen/ Hillebrand 2005) have demonstrated the need for target-group-specific risk communication. This means that instead of directing risk communication at the unspecific, homogeneous population, it should be addressing groups with their differing perceptions and ways of dealing with risk. The target groups thus defined can reflect the above-mentioned characteristics of subjective risk assessment along with personality traits (e.g. attitudes, values, behaviour) and people's socio-demographic situation.

With the help of such typologies, it is possible to pinpoint the information channels and media most likely to reach the groups, and ascertain how receptive they are to the subject, how strong their need for information, and the kind of information that needs to be conveyed.

Perception of the risk under review here, namely that posed by active pharmaceutical ingredients in the environment, is influenced by the following:

- Pharmaceuticals represent a strong social benefit.
- The specific risk is not (as yet) obvious via sensory perception.
- The individual has virtually no means of controlling the risk.
- The risk potentially has undesirable consequences for future generations. These are not known but merely hypothetical.
- Water is an indispensable staple food. Hence there is virtually no question of voluntariness in exposing oneself to this risk.

Target-group-specific risk communication

Risks trigger very different reactions and coping patterns in different social groups. It is therefore fair to assume that these reactions substantially determine whether and how strongly a risk is perceived as such, as well as affecting people's willingness to change their behaviour accordingly.

3 Analysis of communication materials concerning the disposal of unused or expired drugs

The German public still knows very little about the problem of water pollution from drug residues. Nevertheless, in Germany, and internationally, there are plenty of examples for communication intended to alert people to this issue and to promote an understanding of suitable solutions. They differ greatly in the information they provide and how they impart it. Of course, communication in this context also depends on the respective national systems for disposing of unused or expired drugs. Although the scope of this handbook cannot examine all of these individually, an analysis of several sample communication materials is very revealing when it comes to developing an appropriate module within the communication strategy.

The analysis drew on materials which are accessible online, mainly flyers or posters along with several TV commercials. The selection of print media was confined to documents in German and English. The commercials also included Spanish, Portuguese and French ads. All in all, materials from Germany, Australia, France, Canada, Austria, Portugal, Switzerland, Spain and the USA were evaluated.

The main goal is to derive recommendations from the existing examples for a communication strategy in Germany.

3.1 Actors: who communicates with whom?

The material was predominantly commissioned by public institutions. These included governments, public authorities or environment ministries at different federal levels. Another important group of actors is comprised of semi-private initiatives founded especially to tackle the disposal of unused or expired drugs. Examples are RUM (Return Unwanted Medicine) in Australia or SMAPT DISPOSAL in the USA. Also amongst the originators are non-governmental organisations – mainly environmental associations. Private-sector companies such as Sanofi Aventis represent a marginal group.

3.2 Subject matter of the materials: action guidelines and background information

The materials differ greatly in what they communicate. On the one hand they provide action guidelines, recommending either disposal of unused or expired drugs via domestic waste, returning them to pharmacies, or participating in take-back/collection programmes. Over and above this, a small number also suggest how to demonstrate greater awareness when handling pharmaceuticals. Furthermore, the recommended guidelines are often justified in different ways. In the case of American information material, safety aspects play a particularly important role. The focus is on preventing risk to children and addicts from unused or expired drugs in the household or through improper disposal.

The examples differ further in the amount of information offered. Some merely suggest how to dispose or not to dispose of unused or expired drugs. Others provide comprehensive background information on the problems posed by drug residues in the environment, including entry paths, cause-and-effect mechanisms, and scientific uncertainties.

Potential content to be conveyed via communication media

- ➔ Environmental relevance of drug residues
- ➔ Improper disposal as an entry path
- ➔ Action guidelines for proper disposal
- ➔ Safe storage and disposal of pharmaceutical drugs
- ➔ A responsible approach to pharmaceutical drugs vis-à-vis prescription, purchase and alternatives to medication

3.3 Implications and recommendations arising from the analysis

Analysis of the materials[4] shows the importance of thinking through such information media and using a professional approach to prepare them in order to avoid typical errors and enable constructive communication of the problem. The main priority is to word the key message clearly and concisely. It needs to be highlighted by an appropriate layout so that it is seen and understood at a glance. Visuals should not (merely) illustrate but should themselves take the form of action guidelines or provide signals for taking action. Background information placing the problem in context should be brief and secondary to the key message. It should be simply and intelligibly worded. It is always preferable to use an active form of address instead of the passive tense. It can prove helpful to use a question and answer format, using intuitive questions that people ask themselves: 'What do I do with the old drugs? Can I pour cough mixture down the toilet? Does the packaging go in the yellow sack?

[4] Cf. links in Sources of communication materials, p. 67f. and graphic materials in Annexes, p. 69ff.

Rules for constructive communication via flyers, info sheets and internet information

➔ In the case of flyers or internet messages, people often only notice and look at the title page or home page. The main message – concisely worded – thus has to catch the eye immediately and be intuitively clear.

- Here it may prove helpful to apply the 'call from the kitchen' rule: the message must be understood when shouted from the kitchen to someone elsewhere in the home.
- It is important to avoid a distracting array of logos on the title page and blanket/generally worded headings.

➔ The most important background information should follow the key message, lending meaning to actions.

- Here again, it should be readily understandable just by skimming the text. For this reason, any factual information should not be overly differentiated – instead they can be placed in the internet by way of supplementary information.
- The background information should use short, simple sentences that are easily accessible to laypeople. Convoluted sentences or scientific jargon should be avoided.
- The message must be logically compelling for all segments of the population. It is thus important not to moralise or declare ecological imperativess.

➔ The aim is to create a visual/text ensemble that interacts to convey intuitively, i.e. in a non-roundabout way, the right action to take.

- The graphic material must serve the declared communication goal. The pictures should impart the message so effectively as to be clear even without the text. Meaningless illustrations with no real reference to the message must be avoided. The text should be made to seem redundant.
- The illustrations must be of a professional quality, striking, attractive and immediately understandable. They may also use emotion, working with devices such as humour, as long as the humour supports the forcefulness of the message and is not likely to be misunderstood.
- The ratio of illustrations to text must be pleasing to the eye. The text should be set in an open, airy layout, making it easy to absorb, and avoiding the impression of a solid block of text that puts people off reading.

4 Recommendations

4.1 Overarching activity: institutionalisation and issue management

4.1.1 Background to the problem

Many tasks presenting themselves on the strategic communication side can be delegated to scientists, communication and PR agencies, or professionals in the field. Areas in question include specialist articles, campaigns, personal communication and the lobbying of panels and expert committees. There is, however, a risk of the communication work fragmenting into many single activities, whereas a coherent communication strategy calls for overall co-ordination by a resolution panel.

Such co-ordination can be achieved by drawing on the so-called public affairs approach, with the *issue management* tool that has proved so useful in policy advisory work. "Public affairs is the strategic management of decision-making processes in dialogue between politics, business & industry. It makes for the sustainable inclusion of companies, associations, interest groups and organisations". (de|ge| pol 2005: 9, *English translation by Maxine Demharter*). Issue management is used for the systematic planning and control of communication processes (Dujic/Johanssen 2006). It allows a topic to be strategically positioned in public opinion and in different political and institutional arenas. With issue management, undesirable developments in the communication process can be prevented, and, if need be, responded to actively and in good time.

4.1.2 Guidance

Issue management takes place via steering bodies such as a round table discussion with the major stakeholders and actors affected by the issue. This body should be institutionalised for a limited period (at least two years) and run on its own budget. This steering body may, for example, be affiliated to the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), with the Federal Environment Agency (UBA) in a co-ordinating capacity.

The umbrella organisations of the medical profession and the pharmacists are not organised on a strictly top-down basis. Decisions always have to pass through a number of state supervisory boards. We therefore propose allowing sufficient time for the approval processes.

MeriWa – Round table on "Drug residues in water"

- ➔ Setting up the round table at the initiative of the UBA/BMU; getting relevant stakeholders on board
- ➔ Round table co-ordination by the UBA
- ➔ Round table composed of decision-makers from
  - Pharmacists' associations
  - Doctors' associations and specialist organisations (environmental health doctors)
  - Consumer protection organisations
  - Joint Federal Committee (G-BA)
  - Water industry
  - Environmental associations
  - Pharmaceutical manufacturers
- ➔ Further tasks arise from the specific strategies (co-ordination work).

4.2 Population-specific strategy

The population-specific strategy is sub-divided into the two modules 'Target-group-specific awareness-raising' and 'Disposal'. These are outlined below.

4.2.1 Module: Awareness-raising

Background to the problem – conflict inherent in the issue

The population knows very little about the risk of water pollution from active pharmaceutical ingredients. This became apparent from initial qualitative empirical surveys conducted for the *start* project (Götz et al. 2012, forthcoming). The results reveal scant media coverage of the problem, leading to very low awareness of the issues at stake. Added to this is the fact that the topic is highly fraught with conflicts. It is relatively easy to convey the right and wrong ways to dispose of unused and expired drugs. However, the fact that active pharmaceutical ingredients can be excreted into the environment is linked with fear and taboos:

- People who, due to chronic illness, are dependent on medication for survival might worry about limitations being imposed on their supply of such drugs.
- Certain segments of the population (social milieus or lifestyle groups) might be concerned that the great benefits of pharmaceuticals for life expectancy, lifestyle and standard of living could become subordinated to environmental policies and no longer be as readily available.
- The unnecessary use of drugs as a consequence of inappropriate prescription practice is largely a taboo topic. If addressed publically, it triggers emotional reactions, as shown very clearly in the focus groups for the *start* project.
- Furthermore, empirical research has revealed the extremely varied levels of problem awareness in the different demographic groups.

Heterogeneous pattern of risk awareness and risk processing

The qualitative empirical survey conducted for the *start*[5] project used a group process to confront people with information about water pollution from pharmaceutical residues. The participants were given a series of texts, each disclosing greater detail than the one before, and then discussed them. In this way it was possible to simulate a process of gradual enlightenment, which commenced with a single headline on the issue and ended with comprehensive articles. The different forms of reaction were analysed and reduced to five patterns of risk perception and processing. These form the basis for a target group strategy. Figure 2 gives an overview of the patterns which are now outlined below (cf. Götz et al. 2012, forthcoming, for more details of methods and a description).

[5] In 2008, four focus groups were conducted with consumers on the subject of medical products in the environment as part of the *start* project.

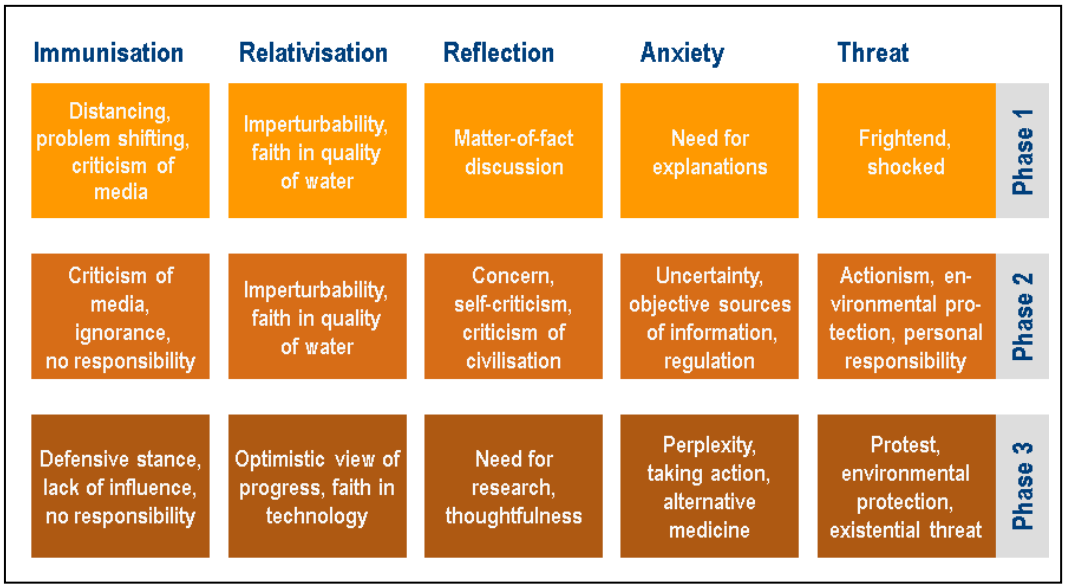

Fig. 2: Risk perception and mental processing patterns

Immunisation pattern: "I don't want to hear about it!"

The term 'immunisation' is intended to indicate a mind-set with which individuals and groups of people fence themselves off from the disquieting revelation or go into denial about the risk.

This pattern adopts the following cope of strategy: other, supposedly far more important or hazardous phenomena are highlighted (e.g. problematic conditions in other countries). People express environmental pessimism and resignation ("everything's already contaminated") while emphasising their own perceived powerlessness in the face of this situation. Furthermore, the facts are often misinterpreted or even reframed in a beneficial or positive light (the 'toughening up' theory: "What doesn't kill you only makes you stronger." This is followed by media scolding in which information is rejected, pointing out the political or financial interests of the respective medium. The news as such is then declared a scandalisation strategy on the part of the media which tend to 'make the most' of this kind of thing, or else spotlight one issue one day and something else the next. Representatives of this pattern openly and explicitly express an attitude of not wanting to know ("The best tactic is to deny its existence!").

Relativisation pattern: "There are far worse things"

'Relativisation' characterises an attitude whereby the new, possibly unsettling information on drug residues in the environment/water is put into perspective by comparing it to other problems. This is a way of taking the edge off the problem along the lines of: "There are far worse things".

They often base their reasoning on their faith in the quality of German drinking water, arguing on the basis that this is one of the best monitored foodstuffs. However, this knowledge is initially used to dispute any facts about possible emissions.

The fact that only very small concentrations of active substances in the water have been proven and the potential risk posed to human health has not yet been shown is selectively highlighted to call into question the need for immediate action. Similarly to the 'Immunisation' pattern, the problem is put into perspective by emphasising worse conditions abroad, or other, supposedly more serious, environmental problems. Here again, media chastisement initially plays an important role in relativising the new information. People in this group are motivated by an optimistic view of progress dictating that uncertainties and risks of this kind are all part of social progress and that the same (technological) progress will in turn tackle and resolve these problems.

Reflection pattern: "It's a difficult question"

People who fit the 'Reflection' pattern begin by thinking rationally about the initial facts received, neither rejecting nor feeling threatened by them. Instead, they feel somewhat affected by the problem and begin to think about it. This leads to critical reflection of their personal behaviour and rational assessment of the logic behind the problem (excretion of pharmaceuticals). Their characteristic response is thus one of matter-of-fact appraisal. The risk is basically described as logically compelling and plausible, and is not called into question. This ultimately creates a belief in the need for research into the environmental relevance of pharmaceuticals.

When representatives of this pattern reflect on the consequences of active substance inputs, it triggers a process of deliberation: while the need to take certain drugs is recognised, the use of others is seen more in terms of an unhealthy way of life (lifestyle medicine). People are aware of the conflict that exists between the common practice of symptomatic medical treatment with the goal of restoring fitness for work as quickly as possible and the more gradual and hence more expensive preventative treatment and rehabilitation. They are quick to draw on personal experience in this respect, constantly finding arguments against conventional medicine and current approaches to the treatment of disease. It is also typical here to see people weighing up whether drug residues in the environment represent an acceptable or unacceptable risk. Given the cost to society of a nationwide thrust to improve sewage treatment, there is some deliberation about the acceptability of a residual risk. The argument that pharmaceuticals provide substantial benefits also plays a role here.

Apprehension pattern: "It's alarming"

People who match this pattern have a strong need for factual enlightenment from reliable sources. They are alarmed, and uncertain as to which information is credible, which is why they call for state regulation. Many put forward the departure from classical medicine as a strategic solution.

Attitudes towards the risk range from fatalism through horror down to total rejection of classical medicine and a switch to alternative medicine instead. People who react along these lines have a strong need for information and clarification as they know nothing about the risk and its origins. They do, however, tend to doubt the credibility of information sources. This, together with a desire for reliability, leads to the call for state regulation. People demand that every possible approach (research, obligations on the part of the pharmaceutical industry, sewage treatment, consumer education, etc.) be pursued in order to achieve the most effective outcome. A certain degree of fatalism becomes apparent from the fact that respondents fail to weigh up the benefits of pharmaceutical drugs against risk potential. Furthermore, in this pattern one often finds sharp criticism of common prescription practices and the doctor-patient relationship. From the reasoning around alternative medicine, it becomes clear that this is a means of bridging the comprehension gap when it comes to the complex, uncertain nature of the risk. Several participants, for example, use the analogy of homeopathic micro-doses to help them understand the possible impact of minor drug residues in water on fish.

Threat pattern: "I need to do something about it right away!"

The 'Threat' pattern ultimately defines the most ardent response to information about the problem under review here. People are frightened and dismayed, and quickly lapse into spontaneous actionism with the desire to implement measures on the spot. Such a response is probably very much due to the heat of the moment, so that tangible action in the longer term becomes less likely.

The reasoning is initially coloured by a sense of being shocked and overwhelmed. Instead of leading this group towards contemplation or reflection, however, it results in the need to undertake something practical right away – also in the private sphere; warning acquaintances, for example, or immediately setting up an action group. People find compelling and legitimate reasons for such actionism by referring to the need for precautionary measures. But on the other hand, they feel powerless in the face of the risk and towards any influential actors involved. From this perspective they are prompted to follow the only course of action open to them: to take things into their own hands. This group thus offers good starting points for implementing action guidelines. As long as such guidelines are not forthcoming from outside, however, there is a risk of these people taking premature and inappropriate action on their own initiative such as propagating the idea of no longer drinking tap water.

The five perceptual and mental processing patterns have been condensed into three target groups for practical strategic purposes. The 'Disinterested' group could not be proven here due to the explicit quota system for the focus groups which prescribed interest in the topic. We know from other empirical projects that there is always such a disinterested group. Since it is extremely difficult to address, we are not including it as a target group here:

Target groups

- ➔ Deniers and relativists
- ➔ Keen learners
- ➔ Hypersensitives

Communication strategy

The primary goal of the communication strategy is make the population aware that there is a problem with pharmaceutical drug residues in water in order to reduce input in the medium term. This process of raising people's awareness should take place without triggering a sense of alarm, which could lead to over-reaction on the part of the Hypersenstives.

Given that drug residues are meanwhile measured in water bodies around the world, the precautionary principle represents a good line of reasoning to take with the general public. In addressing the environmental problem at the early stages, the main focus should be on maintaining what is generally accepted to be the high quality of German water.

The practical objective is to avoid pharmaceuticals being used where there is no therapeutic need. Appropriate measures create synergies for reducing costs in the health service.

Measure

It is important that an experienced agency be commissioned to design a target-group-specific communication campaign with which to make the general public aware of the problem. The tendering process must ensure that the agency can produce references for awareness-raising projects vis-à-vis a social problem or the 'effecting of social change' (cf. Kotler/Roberto 1991). This means they must be familiar with the methods and strategies of social marketing and issue management. The focus here is not on image-building and product advertising, nor attracting the maximum amount of attention. The objective of the communication strategy is to help create adequate public awareness of the issue 'drug residues in water' with the ultimate goal of reducing inputs.

The campaign should be comprised of logical steps on the way to achieving the communication target. These could take the following form:[6]

- A set of requirements defined by the client for the agency (agencies): Is an overall campaign called for, or just partial products?
- Participation in a briefing session[7] by the applicant agencies: the essence of the briefing is discussed in the following step.
- Research and analysis: here, the agency must form its own impression of the situation. This includes looking at important research material such as the results and handbook from the *start* project.
- Participation in a pitch; decision in favour of an agency

[6] In line with Schmidbauer/Knödler-Bunte 2004.

[7] A briefing session provides the opportunity to give the Agency the information it needs to make a tender.

- Target definition: the overall goal is to make the general public aware of the 'drug residues in water' issue (the different target groups should ultimately perceive and appreciate the problem). Awareness and sensitisation should be achieved without causing alarm, as this could make the Hypersensitives over-react. An additional objective is to get people to recognise their own scope for action within an overall social strategy and transfer it to their everyday lives (moving from 'knowing' to 'doing'). Medium-term goal: to reduce the input of active pharmaceutical ingredients by avoiding the use of therapeutically unnecessary pharmaceutical drugs.
- Sub-goals and verifiable intermediate steps need to be laid down in working towards the overall goal. The client must carry out constant checks. We recommend 'keeping the agency on a tight leash'.
- Target group selection (see 'Heterogeneous Models' section): Deniers and Relativists, Keen Learners, Hypersensitives
- Motivation and communication mechanism: the agency must provide evidence of a communicative and psychological mechanism with which people and target groups can be reached, convinced and encouraged to act.
- Positioning: the agency must determine the best way of ensuring that the originator or the message appears distinctive, confident and unique amidst the array of competing messages and design configurations (Logo? Slogan? Colour? Language?).
- Creative guiding principle: this is the Agency's creative act *par excellence* – a design concept based on the motivation and communication mechanism (emotive colour scheme, tone, storyline, etc.)
- Action planning: this is all about developing a detailed, consistent action concept for achieving the declared goals (e.g. kick-off event, media planning, accompanying PR activities, co-operation with supporting organisations and institutions, etc.).
- Success monitoring: Are intermediate steps being achieved? Have the sub-goals and overall objective been achieved?
- Documentation: not just the successes or failures of the campaign are documented but the entire process, from briefing to completion.

Implications for practical implementation

The following boxes describe the key lines of reasoning for the three target groups:

Reasoning for the 'Deniers and Relativists' target group

- ➔ Any information on the problem of measurable pollution tends to trigger feelings of powerlessness and hopelessness within this group. The aim is therefore to provide cognitive and emotional help in facing up to the problem.
- ➔ Given the strong sense of powerlessness prevailing in this target group, the only effective way of communicating the facts of 'drug residues in the environment/water' is to 'diffuse them' into a problem that can be tackled and for which solutions can be found, thus embedding the issue in a pragmatic context.
- ➔ The core traits of the risk under review here, namely complexity and uncertainty, are precisely what this target group is unable to cope with. It is therefore vital to focus on presenting the certainties in a simple form.
- ➔ Proposals for action must relate to simple everyday options free from any finger-pointing. A good place to begin is with 'disposal'. At the same time it is important to address possible future action on the part of the actors perceived to hold the power, namely government and industry: "The ones at the top have an obligation". And so the burden needs to be shared, with separate responsibilities.
- ➔ It is possible to work against denial and relativisation by pointing out the strong relevance of the issue in other countries and the measures in place to tackle it (Sweden, USA).
- ➔ Part of the target group use the tabloid media while at the same time condemning them as unreliable, resulting in turn in general media scolding. This contradictory behaviour can be addressed with a PR policy which ensures that information concerning facts and options for action are always conveyed complete with reputable references and using figures from renowned institutions, even in the popular media.

Media:

- ➔ Press work via the tabloids, popular scientific pay TV programmes and print media, special interest magazines on health & family affairs, pharmacy magazines (Apotheken-Umschau)
- ➔ Brief special information geared to specific target groups via a web portal on the subject (published by: UBA/BMU)

Reasoning for the 'Keen learners' target group

- ➔ This minority amongst the population is ready and willing to get to grips with the hard facts of the issue.
- ➔ The way to satisfy this group's need for facts is to provide independent data conveyed by reputable originators or media so that they can form their own opinion. This concerns both their personal handling of pharmaceutical drugs and the process of weighing up the acceptability of residual risk.
- ➔ Parts of this group are prepared to change the way they use medication and alternative methods of treatment. This, however, is more of a long-term rethinking process and should be viewed in synergy with desirable changes in the health system.

➔ It is fair to say that the members of this group act as disseminators and opinion leaders. Important information and messages do not generally reach the recipient directly from the originator and become subsequently implemented. Instead, opinion leaders rated especially competent in the field come into play, with their interpretations then being taken on board by others.

Media:

➔ Press work via serious newspapers such as "Süddeutsche Zeitung, Frankfurter Allgemeine Zeitung, Frankfurter Rundschau, Welt, Spiegel, DIE ZEIT", and their online magazines, science magazines such as "Zeit Wissen", popular science TV programmes, radio discussions

➔ Separate, target-group-specific background information via a web portal dedicated to the topic (published by: UBA/BMU)

Reasoning for the 'Hypersensitives' target group

➔ Communication with the target group is determined by the strong potential threat they see in this risk. This primarily means: no over-dramatic messages.

➔ The credibility of information and its source plays an important role for this target group: since these people know virtually nothing about the subject and barely understand it, the first step must be enlightenment in layman's terms. Giving the wrong messages can, however, lead to the group becoming anxious and uncertain, and ultimately drawing the wrong conclusions.

➔ This group responds to visible means of tackling the problem. On the one hand this means factual enlightenment, but also regulation in the sense of "this is what can be done". The possibility of overcoming the problem via technical means meets with strong approval to some degree, as in the case of sewage treatment.

➔ What cannot be communicated or only with great difficulty is uncertainty about the effects of the risk, or contradictory research results. The group, like the first target group, finds this very difficult to deal with.

➔ People's openness towards non-conventional medicine could be a starting point for measures resulting in synergies with the healthcare sector such as a different approach towards the use of medication. But here gain, the credibility of the originator is of the utmost importance.

➔ This group is keen to take personal responsibility (albeit in vague terms), and this can be utilised if properly channelled. The use of hand-outs describing suitable and meaningful measures for their personal environment and everyday life can do the job here.

Media:

➔ Press work: "Tageszeitung", alternative press, "Öko-Test", publications by environmental agencies and organisations, radio features, talks and panel discussions initiated by consumer associations and adult education centres, consumer magazines such as "Test", etc.

➔ Separate, target-group-specific background information via a web portal dedicated to the topic (published by: UBA/BMU)

It is important to pay special attention to the 50 to 70-year-olds in the target groups. Some take medication on a regular basis as they are already suffering from chronic ailments.

Flanking measures for the 'Awareness' module

➔ Such a strategy needs to be accompanied by steps to raise doctors' awareness of the issue. It is only once they are fully informed and understand the relevance of the problem that they can react appropriately to patients raising the issue with them (cf. Doctor-specific strategy).

4.2.2 'Disposal' module

Background to the problem

In Germany there is a significant incidence of unused or expired drugs being improperly disposed of via the wash basin/sink and toilet. A representative survey from the *start* project provided evidence of this (cf. Götz/Keil 2007).

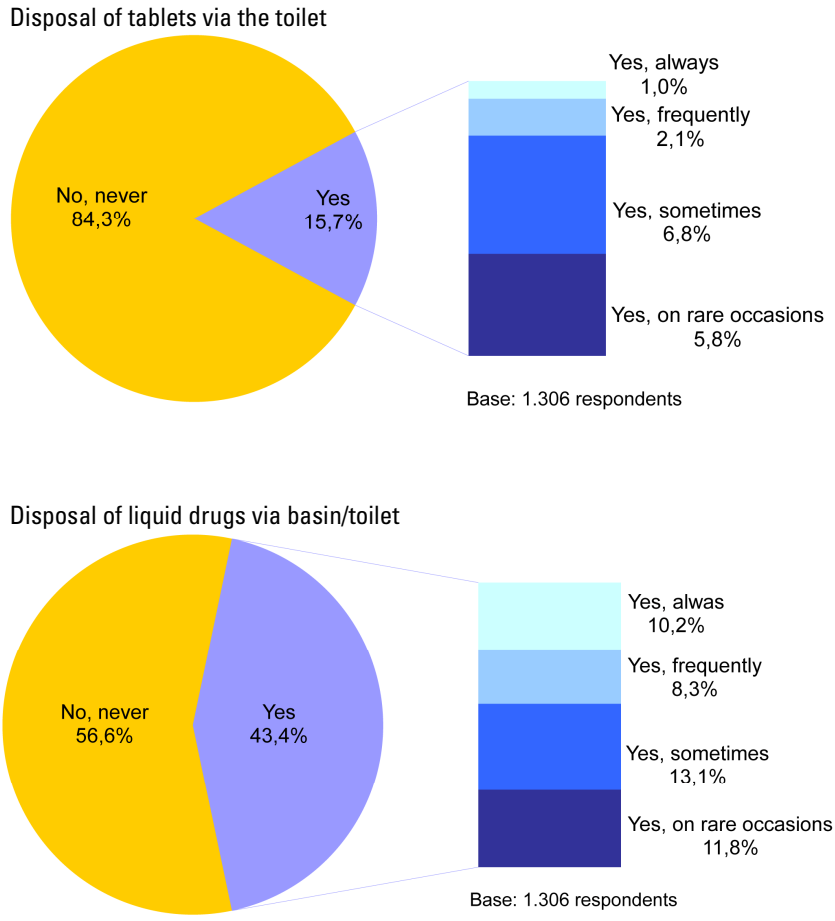

Fig. 3: Disposal of unused or expired drugs via the toilet/basin (representative survey from the *start* project *(cf. start 2008)*

The main reason for this improper behaviour is that Germany lacks a standard regulation for the disposal of unused or expired drugs, plus the fact that there is barely any active consistent communication of the appropriate means of drug disposal already available. There are incidences where recommendations on the part of disposal services, municipalities, and *Länder* differ considerably (see Ch. 3). These range from taking the drugs along to

collection points for harmful or hazardous waste, through disposal along with household waste, down to returning them to the pharmacy. The uncertainty thus triggered amongst the population is gaining new significance given the Germans' strong readiness to recycle. The established routines of waste separation are evidently being indiscriminately transferred to drug waste. This means, for example, that in order to dispose of a medicine bottle in the glass container, it first has to be emptied of its liquid drug – leaving only the plughole or toilet as possible alternatives. This behaviour is heightened through the general public's unawareness of what water pollution through drug residues can actually mean.

Therefore it seems to be an argument for the nation-wide and, if possible, Europe-wide introduction of uniform and binding disposal standards for unused and expired drugs. The recommended course of action is the procedure already established in Germany and other countries such as France, namely that of returning pharmaceutical drugs that are no longer required to the pharmacies.

The German take-back system, so far managed by disposal services and financed by the pharmaceutical industry, is currently undergoing reorganisation (cf. Pharmacist-specific strategy) following a change in the law. There are, however, signs that pharmacies will continue to accept leftover medication voluntarily and at no charge to customers, but in future at their own expense. Surveys amongst pharmacists, both for this project and for *start*, have shown that the pharmacists are basically prepared to continue taking back unused and expired drugs in future as an additional customer service.

However, to further raise acceptance amongst pharmacists it makes sense to simplify the take-back system for staff. So far, employees have been separating the individual recyclables at the pharmacy itself.[8] In future, we feel that this should be left up to the operators of the take-back system. With the new system currently under discussion, this will presumably be the case. Pharmacies are to collect medication, complete with packaging, in special bags for subsequent collection by the disposal service.

As the law stands, pharmaceuticals, barring a few exceptions, are not classed as hazardous waste and so can in principle be disposed of along with household waste. Given the fact that in Germany today almost 100 per cent of household waste is incinerated, this type of disposal is actually unproblematic. Even though this solution is literally 'closest' to consumers' hearts, certain aspects also attract criticism. From a precautionary perspective, the possible risk to third parties such as children at play is something that needs to be taken seriously. These days, a mere seven per cent of Germans always throw their unused or expired drugs out with the rubbish. Should this figure increase significantly in future, so too will the risk of medication occasionally getting into the wrong hands. Pointers as to how this might be prevented – for example, wrapping old tablets in newspaper – are difficult to communicate and hardly practicable. Furthermore, in most member countries of the European Union, collection systems have been set up in recent years, partly because of current

[8] Pharmacy staff has so far had to separate the returned medication into three different sacks according to primary packaging (e.g. tubes and blister packs), packaging components made of cardboard or paper, and the medicinal products themselves. These were then collected by the operators of the take-back system.

legislation. The favoured German solution of getting rid of unused or expired drugs along with the household waste would run counter to a standard solution for Europe.

The German Federal Environment Agency recommends disposal at collection points for hazardous waste as a second option besides the pharmacies.

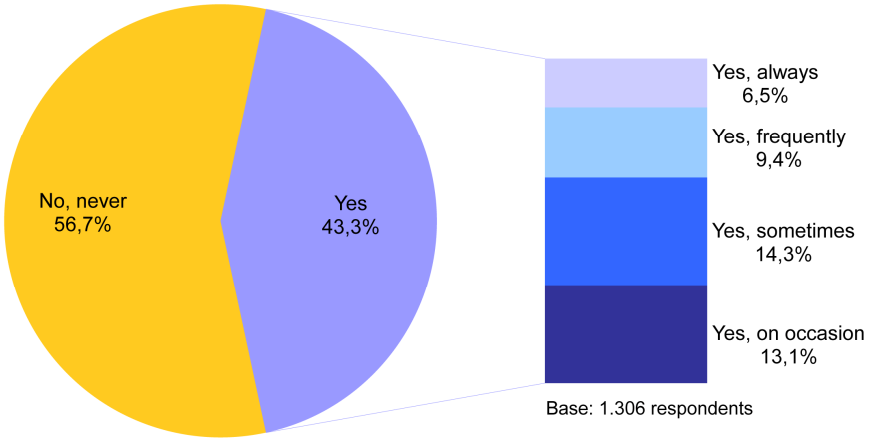

Fig. 4: Disposal of pharmaceutical drugs along with the household waste (cf. *start* 2008)

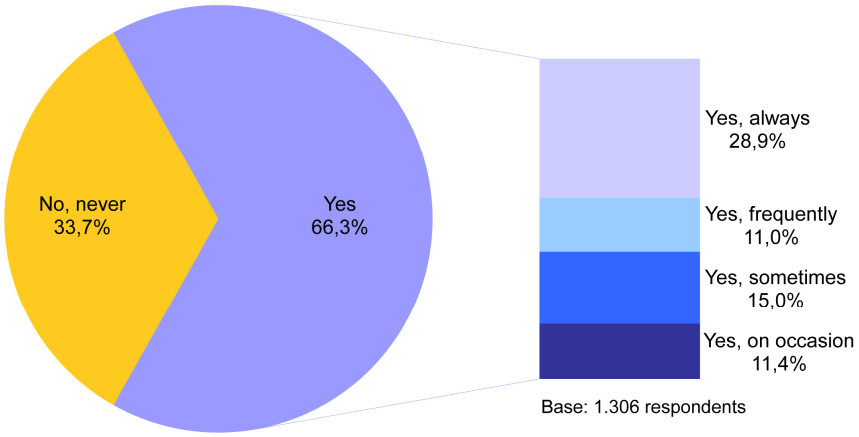

Fig. 5: Disposal of pharmaceutical drugs at the pharmacy (cf. *start* 2008)

Communication strategy

According to the studies by ISOE, only around a third of German citizens always take the medication they no longer need back to the pharmacy. A broad-ranging, professionally planned and designed campaign is called for in order to inform the general public and thus raise this figure. The originator should be a recognised actor with a serious image, for instance the Federal Environment Agency or the Ministry of the Environment – possibly in conjunction with the pharmacies.

Measure

It has long been possible to dispose of unused or expired pharmaceutical drugs at pharmacies and so provides good scope for easy communication. Patients or consumers[9] should be given the express message that all unused or expired drugs – whether prescription or non-prescription – should be taken back to the pharmacy. This should be backed up by a standard reference on drug packaging and on the package leaflet indicating the correct disposal of pharmaceuticals. Although already provided for in the appropriate EU guidelines and also in the German Pharmaceuticals Act, this measure has not yet been rigorously implemented. Before starting the communication campaign, the UBA/BMU should contact the pharmaceutical manufacturers instructing them to print clear pointers for disposal on the packaging.

Here again, it is necessary to plan a suitable campaign to professional standards or have it planned by experts. This becomes particularly apparent upon analysing the existing material (see Ch. 3): almost all material manifests serious technical communication errors. Thus it is advisable to use an agency selected in a tendering process to plan the details of the campaign.

In choosing an agency it is important to clarify whether it is experienced in communication that influences behaviour. It must have understood that this is not about advertising or communicating an image. On the other hand, neither it is about a particularly complex switch in behaviour like that commonly found in environmental communication (e.g. switching from the car to the bicycle).

This campaign should likewise be comprised of logical steps on the way to achieving the communication target. The main parameters are outlined below, beyond which the procedure follows the same cues as in the procedure for the 'Awareness-raising' module:

- Goals: the first goal is to motivate people to handle leftover pharmaceuticals in the proper way. The correct and most simple method is to hand them in at the pharmacy. The aim therefore is to encourage a certain behaviour that is familiar to most, seems obvious, is easy to put into practice and therefore encounters minimal barriers. Those familiar with the correct way of doing things but who are not practising it should be inspired to move on from just knowing to actually doing. Those confused by the latest provisions should regain a sense of clarity. And those few who have never heard of disposal via the pharmacy should learn about it for the first time. A second, equally important goal of the campaign is to reach a point by which those who dispose of leftover pharmaceuticals improperly via household sewage – the toilet or wash basin/sink – no longer do so in future. In addition, all those who might be tempted do so in future should be made aware that this is the wrong way and therefore desist. A generalised form of communication should be used to convey this preventative social norm: "Let's not throw leftover pharmaceuticals into the water system!"[10] Since highly diverse and non-uniform information and communication campaigns have already been conducted

[9] With over-the-counter lifestyle medical drugs it makes sense to speak of consumers.

[10] Borrowing from a proposed slogan by Andreas Bernstorff (Bernstorff-Campaigning) at the workshop of the *start* project on 5 March 2008

on a regional scale, it is important to refer – succinctly – to the disposal routes these campaigns already recommended (i.e. household waste and hazardous waste collection services) next to that of returning the drugs to the pharmacy.

- Target groups: ISOE's analysis of the data from the representative survey did not reveal any socio-demographic differences influencing the right or wrong way to dispose of pharmaceuticals. As such, all segments of the population should be addressed, especially consumers who feel responsible for disposing of pharmaceuticals in their household. According to the *start* representative survey, these tend to be women.[11] In addition, the use of pharmaceuticals increases with age and thus also the amount of unused or expired drugs. In a nutshell this means that a campaign has to be commonly understood, be tailored to those members of the household responsible for disposal (in particular women), and must also take older people into account.

Implications for practical implementation

The **main message** should be:

➔ Pharmaceuticals must not be disposed of via the wash basin /sink or the toilet.

➔ Return all unused or expired pharmaceuticals to the pharmacy.

➔ This applies both to prescription and over-the-counter drugs.

➔ This way we can maintain the high quality of our drinking water.

[11] In seeking to address a female target group, one needs to weigh up whether or not it serves to cement the already asymmetrically distributed household responsibility for the environment (cf. Empacher et al. 2002 on the problem of gender-specific environmental responsibility).

4.3 Specific strategy for pharmacists

4.3.1 Background to the problem

Thanks to their training, pharmacists see themselves as the true specialists when it comes to evaluating the ingredients of pharmaceutical drugs. For this reason they take the issue of water pollution from active pharmaceutical ingredients seriously and regard it as being within their scope of expertise and responsibility. They do, however, complain that their services as important actors within the health system are enjoying less and less recognition. The main reasons for this are that the mail order trade in pharmaceutical drugs is on the increase, with ever more sources of medical consultancy becoming available on the internet. Registered pharmacists, on whom particular attention is focused here, see themselves as direct trustworthy sources of advice for their customers when buying prescription pharmaceuticals and OTC products. They are able to answer questions about health that cannot be posed to mail order pharmacies or discussed with the doctor (cf. remarks on the doctor-patient relationship in Ch. 4.4.1).

Up until the summer of 2009, private households in many locations were able to dispose of their unused or expired drugs at the pharmacy (although not a mandatory service), as the Packaging Ordinance provided for the taking back of pharmaceutical packaging by the manufacturers. The taking back of unused or expired drugs implied in this policy was an additional service, cross-financed by fees for the disposal of medical packaging from pharmacies. This led to a reliable separation of packaging from residual content: up until 1.1.2009, pharmaceutical manufacturers were bound to take back pharmaceutical packaging and, in doing so, to dispose of leftover drugs in the proper way via waste incineration. There was, however, no rigorously communicated standard practice in this respect: the taking back of unused or expired drugs was a service on the part of pharmacies. On the other hands, various waste disposal companies, environment agencies and (private) consumer information initiatives were recommending disposal of pharmaceuticals via household waste, hazardous waste, or even the wash basin and toilet (cf. Deffner/Götz 2008).

The unused or expired drugs and packaging were disposed of via a so-called reverse logistics system[12], by which the different recyclable fractions (cardboard, glass, blister packs and leftover drugs) were collected. The operators of the reverse logistics system provided the pharmacies with the appropriate waste containers and collected them on a monthly basis. The service was cost-neutral for the pharmacies, the costs being borne by the pharmaceutical manufacturers. However, changes were made to the Packaging Ordinance as of 1.1.2009. The aim of this fifth amendment was to improve disposal of sales packaging in households (BMU 2008), but its effect on unused or expired drugs was negative. In order to guarantee disposal, drug manufacturers have to obtain a fee-based licence for the packaging from 'Duales System' (cf. e.g. Günkel 2009 and BMU 2009). Since the pharmaceutical companies were already footing the bill for the reverse logistics system, this meant a doubling in costs. The result was that those operating the reverse logistics system no longer received remuneration from the drug manufacturers for the disposal service and so ceased to run the service at pharmacies in early June 2009. Medium-sized drug manufacturers are

[12] Take back scheme for products or product residues at the retailer.

currently continuing to finance the system, whereas the large groups are not doing so. The situation has been in limbo ever since. ZAV (Waste Disposal Association) is calling for regional solutions to be created by the state ministries of the environment. The largest reverse logistics operator Vfw-Remedica continued to collect the unused or expired drugs up until the end of 2009 – albeit upon payment of a 200-euro flat rate per pharmacy. Besides this, alternative systems such as the 'Medi-Tonne' in Berlin (Ärztekammer 2010; BSR 2009) are being tested on a regional scale.

The pharmacists themselves are in favour of disposal taking place predominantly via the pharmacies. This is in line with their professional self-image, even if they do see room for improvement to the overall process. The current regulation or handling attracts a number of criticisms: firstly, there is and never has been a rigorously communicated norm for private households as to how drugs should be properly disposed of (household waste, pharmacy, hazardous waste). On the other hand, the criteria of the Packaging Ordinance turned separation of recyclables at the pharmacies into a very involved process.

So far there is no obligation for mail order pharmacies to take back unused or expired drugs, a fact which one cannot afford to ignore. Given the global operation of companies, it is necessary to impose standards here for the disposal or return of unused or expired drugs.

4.3.2 Communication strategy

The communication strategy consists of three modules: knowledge transfer and continuing education, disposal system, and strengthening of pharmacist consultancy.

Module 1 – Knowledge transfer

In line with change communication, this module has been devised in terms of 'change processes' (cf. fig. 6). It is the initial aim of the communication to impart knowledge and hence orientation. Such knowledge increases acceptance of the subject matter and paves the way for the ensuing measures. Once the measures have been introduced and accepted, they give way to long-term action thanks to the preparatory communication. In this case, a sustainable handling of drugs is achieved.

At the first stage, pharmacists must be given the opportunity to acquire *factual knowledge* that they can use in their everyday work in their capacity as disseminators.

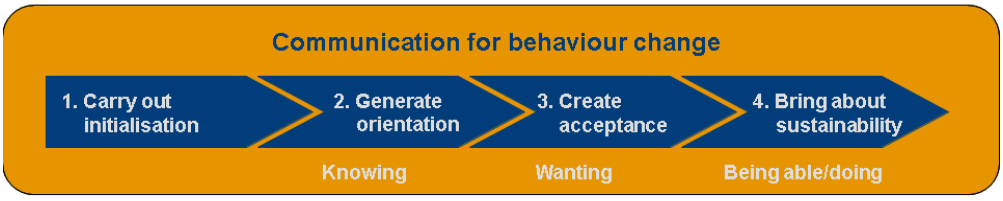

Fig. 6: Communication to accompany change processes (based on IMAKA (o.J.))

Measures

Recognised pharmacist-specific media (print and online) should be used in order to achieve the highest possible level of acceptance and to spread information on the facts and options for action. The representatives of the round table 'Drug Residues in Water' (MeriWa) should be used as a channel through which to set the issue on the regional and national agendas of the pharmacists' associations and have it taken up in curricula for continuing education. This should be managed via personal and institutional communication.

Factual knowledge can be improved by getting relevant reports and studies into the specialist press. This includes surveys on the nature and concentration of the major active ingredients so far detected in surface water, groundwater and drinking water. Moreover, reports on the significance of entry paths and root causes (human and veterinary medicine, human excretions versus improper disposal, etc.) should be published. There should also be broader coverage of the key adverse impacts proven thus far such as those on aquatic life and hypotheses for possible harm to human beings. Opinion leaders of relevant committees and from appropriate institutions should be used to multiply the number of topics in the equation.

It is also important to clarify the significance of the *precautionary principle of environmental policy* for the actual substance of the problem. This needs to be highlighted as a formal component of German and European legislation, as the precautionary principle also has to be heeded by actors in the health system. The self-perception of pharmacists, which differs from that of doctors, can be tapped into here. Whereas the latter place healing right at the top of their value hierarchy, environmental protection tends to be very much a part of pharmacists' professional self-image. They see a logical connection between environmental and health protection and so this is an area that invites direct communication.

A basic knowledge about pharmaceuticals in the environment can be integrated in pharmacists' *basic training*. In order to establish it firmly in practice, the subject can then be incorporated into their *specialist training*. Knowledge transfer with a view to practical scope for action can then take place as an on-going process in the form of *continuing training*. This has been provided for since 2002 via a certificate of continuing education, for which 150 credits have to be obtained as proof of attendance at certain events, seminars, etc. The certificate serves quality assurance for patient care (ABDA 2008). It is therefore important for credits also to be awarded for continuing education on the subject of drug residues in the environment. This would mean more frequent exposure to a perception of the information on offer, with knowledge and its dissemination not merely dependent on personal commitment. A broader knowledge base can be created by dealing with the subject in connection with water abstraction and treatment, and with the methods and problems of proving that pollution has occurred.

Continuing education events are designed and offered by various institutions such as the Federal Union of German Associations of Pharmacists (ABDA) or the respective Regional Chamber of Pharmacists – mostly in conjunction with private providers. Accreditation is the domain of the regional chambers of pharmacists. In order to come up with an appropri-

ate offering, it is therefore necessary to recruit the assistance of the regional chambers and the ABDA or rather its Academy of Further Education.

Implications for practical implementation

➔ Creation of a **publication strategy with press mailing list** through which to convey facts and get papers published; also invitations to specialist journalists to become active

Examples of media which should be taken into account:

Deutsche Apotheker Zeitung (DAZ):
Deutscher Apotheker Verlag, Dr. Roland Schmiedel GmbH & Co., Stuttgart

Neue Apotheken Illustrierte (NAI):
Editor: ABDA – Bundesvereinigung Deutscher Apothekerverbände, Eschborn,
Govi-Verlag Pharmazeutischer Verlag GmbH

Pharmazeutische Zeitung (PZ):
Editor: ABDA – Bundesvereinigung Deutscher Apothekerverbände, Berlin

Apotheke ad-hoc:
Online Info: www.apotheke-adhoc.de

➔ **Information platform on the internet**: to distribute the Handbook and suitably prepared e-learning documents for multipliers within the pharmacists' umbrella organisations

➔ **Awareness strategy:** the precautionary principle is considered an essential element of environmental policy with 'directive' status. It is the basis for measures such as the disposal of expired drugs via pharmacies being accepted by the general public and for customers to receive suitable advice on how to handle drugs and perhaps consume less of them. The communication should likewise take place via the media named above (and others) along lines that follow the basic rules of targeted communications.

➔ **Continuing education strategy:** design of teaching modules for integration in continuing education programmes. Content: risk posed by active pharmaceutical ingredients in water and general data on water abstraction and pollution. The accreditation of such courses takes place via the regional chambers of pharmacists.

Academy of Further Education of the German Chamber of Pharmacists: ABDA – Federal Union of German Associations of Pharmacists, Pharmacy Division – Continuing Education Unit

Media: 'PZ Prisma – Materialien zur Weiterbildung', is published quarterly by Govi Verlag

Module 2 – Disposal of unused or expired drugs

This strategy is primarily concerned with supporting pharmacists in motivating their customers to return every single unused or expired drug to the pharmacy. The focus here is not on separating recyclables. It is far more important to communicate what effect it has on the environment if drugs are improperly disposed of. We recommend that a regulation be found to act as a national standard.

Measure

Re-organisation means that the reverse logistics system is geared to dealing with far larger quantities of leftover drugs than before. The system has been simplified. This includes the downstream separation of recyclables in the sorting centres, as already offered by Vfw-Remidica. This takes the burden off the expensive, highly qualified staff in the pharmacies. It also involves shorter collection cycles to relieve the storage problem. The system must be soundly financed via the pharmacies. At a final project workshop on 24 March 2010 in Dessau, a proposal was made to set up an EU fund in the long term for this purpose. All relevant actors would pay into this fund (pharmaceutical industry, pharmacies, mail order pharmacies and/or internet retailers) in order to finance the costs of disposal via the pharmacies.

Communication should focus here on the fact that in this way the high quality of German drinking water can be maintained. At the same time, the pharmacies themselves should be made to appreciate the point of the ('new') regulation and to support the measure through their personal motivation.

Implications for practical implementation

- ➔ Expedition of negotiations between legislator, pharmaceutical companies, reverse logistics operators and pharmacists concerning a new take-back system (via reverse logistics operators or local waste disposal companies along the lines of Berlin).
- ➔ The co-ordination and design of communications for pharmacies should be the domain of the MeriWa committee (see Ch. 4.1).
- ➔ The take-back system must then be uniformly conveyed to the general public (see Ch. 4.2 Population-specific strategy, Disposal module).

Module 3 – Strengthening the consultancy role of pharmacists

As mentioned earlier – pharmacists see themselves as a highly credible source of advice when it comes to purchasing medication, particularly given the competition from growing internet trade. They see no conflict between sales interests and giving advice that under certain circumstances may also recommend not taking pharmaceutical drugs. From the pharmacists' perspective, it can only boost their image and credibility if they increasingly advise people to apply fewer or alternative therapies. An important aspect of the advice they impart is geared to securing compliance and optimising therapy. Environmental aspects may also play a role, especially when advising ecologically aware customers. This, however, is only for the particularly committed and is more conceivable in terms of *added value*.

Measure

The publication strategy proposed in Module 1 can be extended in the medium to long term to include topics such as drug monitoring and evaluation, and environmental classification (cf. Sweden's classification system for pharmaceuticals, Stockholms läns landsting/Stock-

holm County Council 2009). This will serve to strengthen pharmacists' know how with a view to advising customers accordingly if need be.

Implications for strengthening the consulting role of pharmacists

➔ Based on their know-how and understanding of their customers, pharmacists can touch on the environmental aspects of drugs in sales talks with certain target groups.

4.4 Specific strategy for doctors

4.4.1 Background to the problem

It became apparent during the qualitative interviews with doctors that the majority were not aware of any problem with active pharmaceutical ingredients in water. It plays no role in their professional everyday routine, neither with regard to the prescription of medication nor its disposal (cf. Deffner/Götz 2008). The doctors complained about the lack of hard scientific facts vis-à-vis the occurrence of individual active substances in water bodies. The same applies to the negative impacts on the animal and plant world. The interviews revealed reservations about possible counteractive measures: the doctors are afraid of the spotlight switching from healing to other objectives[13], or of still more regulations restricting their room for manoeuvre.

In the *start* project, it was concluded from the results of these interviews that the medical profession first needs to be made properly aware of the issue. Simply providing more information, however, is not the way to bring about adequate awareness of the problem. Instead it is important to take into account doctors' specific professional and scientific self-image. A suitable communication strategy thus needs a modular design that allows doctors' autonomy in reaching their own conclusions in a manner consistent with their scientific/professional role and perceived status. This initially calls for the dissemination of strictly factual information on drug residues in the environment, bearing in mind the initial aim to increase doctors' awareness of the issue.

Specifically from a communications perspective, the interviews with various specialist medical professionals carried out within *start* were reanalysed. In addition, a further focus group was conducted. This generated some relevant new insights: firstly it was confirmed that doctors can be divided into three groups based on their reactions to the problem of drug residues in the environment/water (see also fig. 7):

1. Active defence and refusal to address the problem
2. Detachment and relativisation
3. An open mind on and willingness to address the problem

[13] This becomes apparent from the following quote: "Conversely we could ask the somewhat provocative question: so we aren't allowed to prescribe any more drugs for fear of jeopardising the environment?" (Quotation Pe/GD 19.05.09).

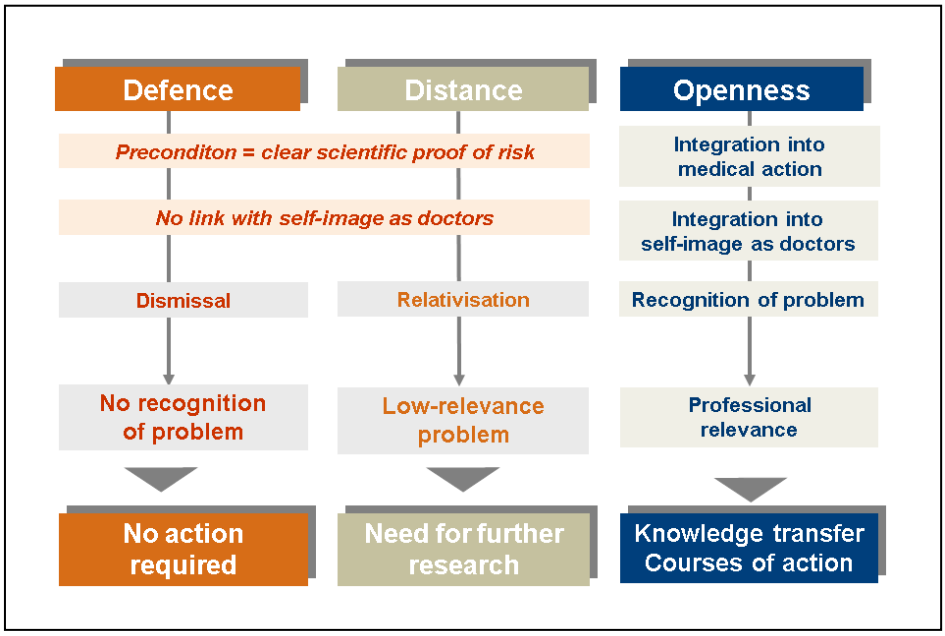

Fig. 7: Reaction patterns amongst doctors

Prevailing defensive response

An additional focus group with doctors in the spring of 2009 revealed how the 'Defence' pattern can dominate other reaction patterns and, by the way its arguments are presented, can block any constructive discussion of the issue. This defensive stance is probably very widespread in the medical profession, which is why it must be taken seriously and taken into account when planning a communication strategy.

The reasoning behind this defensive response revolves around uncertainty about the actual extent and implications of the problem, although this is precisely what characterises the risk. The result is a call for scientific, causal evidence of the negative impacts, particularly the direct risk of harm and toxicity to human beings. The following quote demonstrates this:

> "They talk about a problem and the solution – but they haven't yet shown that a problem exists. They simply haven't shown anything at all. They haven't come up with a study to convince us that there is any problem. Now we're already talking as if the problem were already upon us." (Quotation Ma/GD 19.05.09)

Although this attitude could in the first instance be interpreted as scientific reasoning, it is in fact a case of using scientific language to dismiss the issues at stake. This is apparent from the reaction to measures launched abroad. For instance, the environmental classification of pharmaceuticals undertaken by Stockholm County Council is evidence of the fact that here the problem is recognised as such. In the focus group, people reacted to information about this classification by assuming that interests other than environmental concerns lay behind the measure. This becomes clear from the remarks of one doctor:

> "Well, I simply don't believe that you can do something like this if [you] are independent. I [don't] think that a County Council like this can produce the kind of complexity present in the list. There must be other interests behind it. I just don't buy it. Forgive me for seeing this in a political light, but the assessment [sic] – how do they actually arrive at an assessment – on what are they actually drawing here? You really do have to put a question mark above it.

> A list like this isn't a bad thing in itself – but who comes up with something like this, why is it undertaken, who pays for it, in whose interest has it been done? I can sense a few problems in that respect."

The various attempts at negating the problem are accompanied by the desire to prevent any discussion about the relevant role of doctors here. This stance proves very dominant in the course of discussion. It has a negative effect on the willingness of those doctors with a somewhat more neutral or open attitude to discuss the problems.

Causes of the defensive response

What are the causes of this defensive attitude, sometimes demonstrated quite aggressively by some doctors. The focus group uncovered several reasons: first of all, it is clear that doctors do not feel responsible if the problem in question is confined to the environment with no immediate impact on human health. They feel that other instances are then responsible. The problem only takes on personal relevance for them when there is proof of an effect on health. Here, however, it is surprising to note the lack of thought given to prevention. Since initial changes to aquatic life caused by active pharmaceutical ingredients have been proven, one could argue, that there is a need to counter any potential risk to human health, especial that of particularly vulnerable groups such as (unborn) children. And yet the opposite proves to be the case. The discussion about measures to reduce the input of active substances is blocked early on, and even declared taboo. In the course of the focus group, further causes became apparent:

As a result of regulations perceived in terms of a 'perpetual health reform', some doctors feel under constant pressure to rationalise and cut back on costs. They see this pressure as running counter to the task of healing and restricting both time and financial resources to a minimum. This situation is frustrating for some doctors and leads to clock-watching 'conveyor belt' medicine. As they see it, there is virtually no time left to chat, listen and respond to their patients. The tight budgeting results in keeping consultations with patients who have state health insurance as brief as possible. This in turn exacerbates the existing practice of prescribing drugs as the quickest way of doctor and patient reaching an agreement. The prescription is increasingly turning into a tool with which to 'propel' patients out of the doctors' surgery again as quickly as possible:

> "Yes, it's also partly the point of visiting the doctor, especially for older people. They need some justification for going to the doctor. 'I need a drug', when all they might really need is social contact. But basically speaking, this act, and writing a prescription is an act, is a very substantial part of what goes on at a doctor's surgery. It marks the end of the consultation and the doctor can bring things to a close [...]. It's incredibly difficult to send the patient away without medication, because they want you to give them something." (Quotation St./GD am 10.05.09)

Health system structures impose restrictions on the room for manoeuvre open to general practitioners and a strong dissonance emerges between wanting to do and being able to do – between a doctor's aspiration and the professional framework. The consequences are aggression, feelings of guilt, cynicism and resignation, as becomes clear from the following quote:

> "[...] pointless, I've sat there working until burnout set in: it didn't do any good. I get the problems facing this country in my surgery. It's all about maintaining social rights, about pensions or the social security office; half the patients were addicted to drugs – sleeping tablets – because they were elderly. You couldn't do anything. And so I simply dropped out [...]" (quotation St/GD 19.05.09)

Given this background, any discussion about drug residues in the environment triggers an affect. On the one hand people are afraid of an external (possibly governmental) player introducing non-medical arguments that interfere with their treating of patients. On the other hand, it addresses a conflict in which many doctors find themselves, but which is deemed a taboo; the one-sided nature of drug prescription practice. The issue of drug residues in water also latently implies the other, extremely sensitive topic of too many (unnecessary) drugs being prescribed because doctor-patient interaction has to a large extent (unintentionally) become reduced to the act of prescribing pharmaceutical drugs.

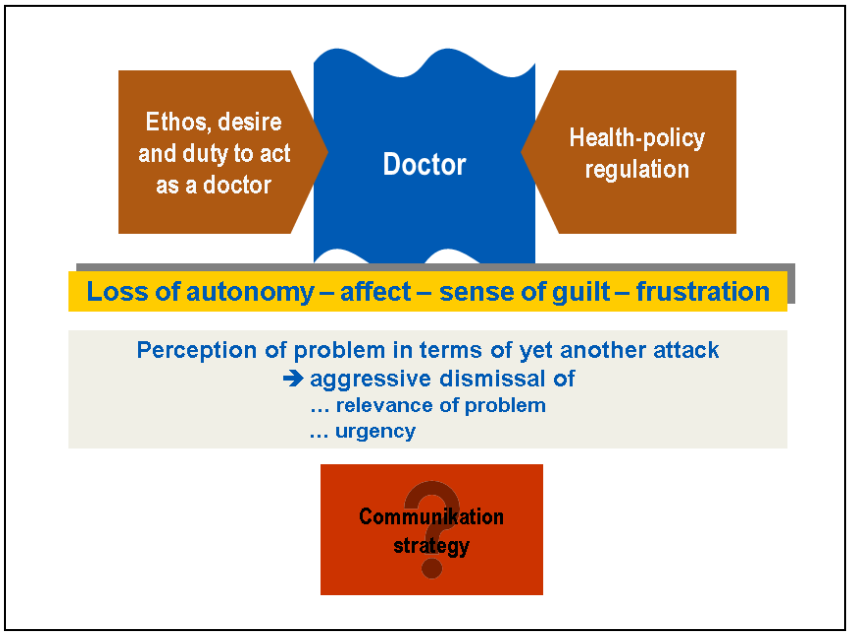

Fig. 8: Background to the dominant defensive response from doctors

The 'openness' response pattern

There is, however, also a group of doctors who are prepared to treat the problem seriously. This became apparent in a further focus group with 'discerning doctors'. Its participants were selected on the basis of whether or not they sympathised with either environmental medicine or naturopathy and took a critical view of pharmaceutical medical treatment.[14] The hypothesis was that there are doctors who are prepared to look into the effects of medication on the environment and particularly at the doctor's role in this. This assumption was largely confirmed.

[14] The focus group was carried out in January 2010.

This group is aware of pollution from active pharmaceutical ingredients and also consider it a real problem. Even so, knowledge still tends to be somewhat hazy and is not seen in the context of its own medical conduct, at least not at the beginning of the group discussion.

> "[...] so which substances are traceable in drinking water? I'm sadly ignorant on that score."(Quotation Mo/GD 19.01.2010)

Initially, no connection is made between the emission of active substances and personal prescription practice. Awareness of the environmental relevance of the drugs thus holds no relevance when it comes to medication and deciding what course to follow.

> "I actually felt a bit shocked myself just now. I never gave it a thought until hearing this question: gosh, how are you and your prescription pad polluting this water day after day? I've never thought about it when writing out a prescription. [...] I know this problem exists, but I've never considered myself the polluter." (Quotation Ch/GD 19.01.2010)

In the course of discussion, participants are, however, quick to get to grips with the topic and recognise the link between environmental pollution and their own behaviour, namely the contribution made by the way doctors prescribe medical drugs. As the discussion progresses it becomes clear that the doctors are becoming increasingly prepared to reflect upon their prescribing practice from the specific perspective of environmental pollution. This means that any communication strategy not only has to convey facts, but must also explicitly make a logical link between water pollution and prescribing routines.

This group of doctors actually finds it easier to declare their willingness to show restraint in prescribing pharmaceuticals since the majority of their patients are themselves critical of prescribed medication and demand a restrictive approach to the use of drugs. These doctors criticise what they see as the inappropriate prescription routines of their colleagues: as touched on in the previous section, they see the situation as the result of a strong tendency towards a conveyor belt medical system revolving around prescribing drugs and featuring insufficient communication with the patients.

Describing the style of other doctors, one participant explains:

> "He manages his practice according to the ritual he considers best, and that includes prescribing lots of drugs. There's no other way of doing it, otherwise he can't get the people out of the door quickly enough." (Quotation Ch/GD 19.01.2010)

Thus they criticise the excessive and unnecessary use of drugs from a perspective that has nothing to do with environmental relevance. The special focus here is on the marketing activities of the pharmaceutical industry, which increases an active need for medication amongst patients. This leads to an attitude of believing that patients need to be 'served' with drugs, even in cases where not medically meaningful.

> "The marketing clearly targets the patients directly by creating needs."(Quotation Ma/GD 19.01.2010)

For the communication strategy it also becomes clear that the originators must be very carefully chosen. Some members of this group of doctors are very critical of professional associations and similar professional organs and their media.

> "For me, the [professional association] smacks very much of being 'at the beck and call of the pharmaceutical industry'." (Quotation Ma/GD 19.01.2010)

As for auxiliary measures to tackle the problem, this group shows an open mind on the subject. The idea of a pharmaceuticals classification based on their environmental properties is welcomed as long as it is easy to handle. This means it must lend itself to integration into existing practice software according to discipline. These doctors are in fact already prepared to consider non-drug forms of therapy and engage in 'narrative-based medicine'.

> "There are lots of things that can be treated without medication, at least in my field, things that could be solved through physiotherapy if we had the appropriate health insurance budgets to work with." (Quotation Ge/GD 19.01.2010)

> "[...] the fact that I tend to practice narrative-based medicine, and that sometimes helps cut down on drugs." (Quotation Ch/GD 19.01.2010)

Although these doctors recognise the relevance of the problem and prove receptive to appropriate measures, they are apparently doubtful as to whether this also applies to their colleagues. Thus they also think it important to increase awareness on the 'demand side', i.e. amongst patients. However, none of this means that the subject of emission is relevant for the prescription-related decisions of these doctors. In this context, they argue along the same lines as all other groups of doctors surveyed, saying that the environmental issue is not what clinches their decision:

> "My filter when it comes to prescribing or not prescribing has [...] nothing to do with this environmental issue. Instead I just look to see if the patient needs something, if it will do him some good, or else I say: It'll go away of its own accord after a while so you can try without, or not, whatever you wish. [...] But I don't think this environmental thing would come into play in my individual decisions because I basically believe that to take nothing is always the best way if possible." (Quotation Mo/GD 19.01.2010)

But it becomes clear that a restrictive approach towards pharmaceutical drugs is indeed possible and being practised. This means that there is not necessarily any automatic process for prescribing drugs, nor is there any pressure within the health systems to lapse into 'conveyor belt and prescription-based medicine'. A further lesson to be learned from this group of doctors is that the attitude of the patient does indeed exert an influence. The restrictive stance of doctors together with their patients results in the positive side-effect of fewer pharmaceuticals ending up in the environment – regardless of the motives behind it.

4.4.2 Communication strategy

The strategy outlined here consists of four modules: firstly, that of anchoring the subject matter in medical boards; secondly, addressing strategic core target groups; thirdly, sensitising the medical profession; and fourthly, conveying different opportunities for action. The strategic communication should enable several goals to be achieved: removing barriers preventing any discussion on the subject, imparting insights and knowledge via the appropriate content and language, and enabling doctors to form their own professional conclusions. Furthermore, it is important to make a logical connection between doctors' (own) prescription practice and the problem of drug residues in the environment. In the long term this can help develop a willingness to view the reduced use of medication as a solution, to address the idea and ultimately put it into practice.

Module 1 – Anchoring the subject matter in the main medical boards and institutions

Before public communication gets underway, the problem as such needs to be recognised within the medical profession. The structure of the medical profession is very hierarchical and thus calls for a top-down strategy.

Measure

One initial step would be to persuade the relevant medical institutions to participate in the 'MeriWa' steering committee described earlier. Once a commitment of this kind has been secured, it is made public, i.e. published in key medical media. This provides a signal that opinion leaders within the medical profession have taken the problem on board whilst creating a certain top-down pressure on institutions to follow suit. The problem thus no longer attracts purely subjective evaluations.

Implications for practical implementation

- ➔ Setting the topic on a sound footing with important **medical functionaries** as a precondition for gradual acceptance of the problem (given the defensive stance)
- ➔ Persuading the functionaries to participate in a round table still to be set up (MeriWa)
- ➔ Such participation and thus recognition of the problem's relevance must be broadly communicated to the medical profession. The overall communication process can benefit from the garnering of support and backing by the medical representatives in this committee.

Module 2 – Raising awareness within the medical profession

This module is all about informing the doctors about drug residues in water on the basis of scientific facts. The aim is to attract initial attention in a general context. It is important here to go into all the relevant facts: for instance the quantitative statements on the ratio of different emission sources (human vs. veterinary medicine; hospitals vs. doctors' surgeries; disposal vs. excretion), the main active pharmaceutical ingredients traceable in water, the first proven negative impacts, etc. The link with doctors' everyday routines needs to be made, and any references to supposedly far more important sources of entry such as improper disposal or agriculture/veterinary medicine refuted. This must, however, take place without any moralising allocation of responsibility. A key aspect here is to quote research findings from institutions and sources that enjoy unequivocal renown and recognition amongst doctors.

Furthermore, the problem must be recognised within major medical associations and professional bodies. The objective is to work out guidelines and to publish them in print media and on the internet. In the interviews with doctors, it became clear that recognition by the medical associations is the decisive factor in getting specialists in private practice to take note of the problem. Discussing the subject in the medical associations also involves liability issues, for instance with regard to drug substitution (patients could make legal claims regarding their right to a certain medication).

A communication strategy addressing critical issues of this kind must particularly consider doctors' professional self-image: they see themselves as science-based workers dedicated to the art of healing. This also implies that for many doctors the "medical evidence" or direct scientific proof of harmfulness to human beings is the precondition for acknowledging the problem as such in the first place. Moreover, given the existing uncertainty it is vital to use very precise reasoning when trying to justify preventative action. Ultimately, any possible responsibility on the part of doctors for an environmental problem must be proportionate to the profession's core tasks. The doctors must be able to identify a clear correlation with their medical work. In the absence of legislation on the subject, change to work practices is more likely to come about via self-education and the discourse within the profession. In the end this means: increased awareness of the problem in order to change prescription practice in the long term must stem primarily from doctors' personal insight and discretion. On no account can it come from outside, and certainly not from medical laypersons. The publishing of specialist articles on the situation surrounding water pollution and its consequences in media highly respected by the medical profession can pave the way for such discursive self-education (see Measures).

Measures

The task of selecting suitable communication tools must be assigned to a PR agency, which then plans and implements the process from start to finish (cf. Issue Management 4.1). Conceivable publication routes are:

- Specialist articles in medical print and online media of different orientations. The media are used to disseminate facts and options for action, and thus create the greatest possible willingness to go into the subject at greater length. These media are:
  - print media that possess credibility and renown in the minds of doctors (e.g. Deutsches Ärzteblatt, specialist media for environmental medicine practitioners, journals aimed at specialist doctors such as gynaecologists, psychiatrists, internists, oncologists, rheumatologists, radiologists);
  - medical online journals and medical web platforms;
- Special-interest publications in which therapies, prescription practice, efficacy and side-effects are critically examined (e.g. Das Arzneitelegramm);
- Papers at congresses and conferences, e.g. professional association congresses (directed at the practitioners!);
- Training modules at seminars for specialist journalists;
- Information portal on the internet containing retrievable e-learning materials and e-lectures.

Consultation sessions at the associations of national health insurance doctors (KV) constitute a further measure beyond that of 'awareness' communication. These sessions are obligatory when it comes to budget overruns in the doctors' surgeries. The KV advisors can be trained on the subject of pharmaceuticals in the environment and then inform the doctors accordingly.

We presume that the parallel communication strategy for boosting awareness amongst the general public (cf. Chapter 4.2) will also be noticed by the doctors. This will in turn signal the relevance of the topic for the whole of society.

Implications for practical implementation

In planning a communication strategy it is important to consider how to deal with a potential defensive reflex that, despite being emotionally charged, is rationally argued and could block any objective discussion of the issue.

- ➔ When communicating to doctors, the problem of pharmaceuticals in water must be addressed in a way that avoids making them feel like the cause of the problem and taking offence.
- ➔ Every effort to address doctors must take place while recognising their medical achievements.
- ➔ It must be made clear that there is absolutely no intention of interfering with medically indicated prescriptions.
- ➔ The language of communication must be adapted to the medical discourse. If possible, the information should be conveyed by doctors themselves.
- ➔ In alluding to the taboo topic of 'prescription medicine', it is important to be aware of the conflict between cost reduction and healing – in other words the synergies between cost reduction and input reductions need to be made clear.
- ➔ The problem should also be addressed via recognised medical institutions and media – in other words, always from the top down.
- ➔ The originators must enjoy credibility and authority within the medical profession.

A selection of print media directed at (specialist) doctors:

- Deutsches Ärzteblatt , Cologne
- Der niedergelassene Arzt, WPV Wirtschafts- und Praxisverlag GmbH, Cologne
- Fachärztliche (Online-)Depeschen-Dienste, for example: Praxis-Depesche, Gyn-Depesche, Onko-Depesche, Neuro-Depesche, published by: GFI. Gesellschaft für medizinische Information mbH

Module 3 – Addressing strategic core target groups

The segmentation presented in Chapter 4.4.1 shows that parts of the medical profession are open-minded about the problem. We expect such sub-groups to take note of both scientific facts and proposals for solution and, in some cases, act accordingly. This particularly applies when the proposals lead to reduced costs as a result of a more economic approach to prescribing medication. Practitioners of environmental medicine, critically minded doctors, and doctors in their own practice have been identified as such open-minded groups, whose clientele favour naturopathy and 'talking medicine'. "Environmental medicine deals with the impact of environmental influences on the health risk to the individual and the public at large. This embraces the medical care of people with health issues and medical diagnoses arising from environmental influences." (European Academy for Environmental Medicine 2010). In the interests of prevention, practitioners of environmental medicine are prepared to look seriously at the long-term potential effects of drug residues in water. It is therefore

fair to assume that this group can act as a professional and discursive bridge to other medical professionals. On the other hand, one also finds ardent controversy within the medical profession when it comes to the results of environmental medicine. This being so, it does not suffice to merely get the specialists in this field on board.

There is no firmly defined group behind the term 'critically minded doctors'. It features different (information) networks that are open to differentiated knowledge input and could play an important part in the discussion. These are doctors with a critical view of prescription medicine, who are reluctant to allow pharmaceutical manufacturers to influence the way they prescribe medication. One institution where this kind of discerning doctor can be found is MEZIS ('Mein Essen zahl ich selbst' – 'I pay for my lunch myself'), whose members take no incentives from pharmaceutical companies whatsoever. They are amalgamated at international level in 'Healthy Skepticism – Countering Misleading Drug Promotion'. This group also includes the website *www.bittere-pillen.de*. In their publications they not only favour a meaningful and economic use of medication but also report on the correct disposal thereof and on the results of water pollution due to active pharmaceutical ingredients. However, due to their critical stance, these groups and networks cannot be misinterpreted as opinion leaders or disseminators for the overall medical profession.

Measures

Apparently, groups of doctors do exist who are prepared to look into the environmental relevance of active pharmaceutical ingredients and acknowledge it. But in their case also, it is necessary to convey facts and tie in the problem with doctors' practical and prescription routines (see Module 2).

Implications for practical implementation

- ➔ The open-minded doctors form a group in their own right and can only be informed and made more aware via media and channels specifically geared to their specialist areas and networks. They take a very critical stand towards professional associations and similar organisations along with any affiliated media.
- ➔ The open-minded doctors are evidence of the fact that there is no automatic mechanism in the health system that forces people into 'prescription medicine'. A restrictive approach towards pharmaceutical drugs for medical and economic reasons is possible and can also have cost-saving consequences for the health system.

Examples of associations

- Deutscher Berufsverband der Umweltmediziner: www.dbu-online.de
- 'Mein Essen zahl ich selbst' (MEZIS e.V.): www.mezis.de
- Healthy Skepticism: www.healthyskepticism.org
- Bittere Pillen: www.bittere-pillen.de

Module 4 – Communicating practical options

This section is all about conveying to doctors how they can change the way they write prescriptions and advise their patients. It is probably the most difficult part of the communication strategy and has attracted the following proposals for suitable approaches and measures:

Stronger consideration of non-drug forms of therapy: the communication strategy should make doctors aware that it can prove effective within an overall treatment plan to prescribe general health-promoting measures. This includes therapies that do not use drugs but have a preventative effect, thus reducing the intake of medication. Examples of such prescriptions that promote a healthy way of life are: going for walks, joining a sports club or gym, and changing one's diet. Experiences in Sweden show that patients are very receptive to this kind of advice, particularly when handed out in 'prescription form'. It is seen as something more binding than if the doctor were merely to recommend a change of behaviour. What is more, this way it is possible to cater for patients' expectation of being given a prescription when they visit the doctor:

> An environmental health professional: "The more pressed for time the doctor, the more they tend to prescribe a drug in order to minimise the time needed for discussion and explanation [...] "So you just give them something." Oncologist: "It's the same old topic as far as I'm concerned. Doctors prescribe far too much to patients – certainly less than they used to, but when you go to a patient's home on an emergency call and see the stocks of medication that some have, then it's definitely an excessive amount [...]" (Source: interviews with doctors in *start*)

Pilot schemes practising this are already underway in Germany. Take, for example, the campaign by the Medical Council of the State of Hesse, 'Fit and healthy with a "prescription" for exercise'. Other initiatives to support prevention have been launched by health insurance companies (e.g. Barmer Ersatzkasse, TKK, etc.), in which they offer a bonus programme: if insured persons take advantage of health-promoting offers, they are entitled to financial compensation or discounts. In order for doctors to be able use such tools as an alternative to medication, health insurance companies need to accept and authorise these forms of prescription.

Caution in prescribing active ingredients classified as ecologically relevant: this assumes the existence of an environmental classification system integrated into the major works of reference/recommendation and medical practice software used by doctors.[15] Within the publication recommendation outlined in Module 2, 'Awareness strategy', we suggest informing people via studies that discuss from a medical point of view where and to what extent cautious prescribing is possible. Some examples of such studies might be those on scientifically controversial therapies (cf. hormone therapy; WIdO 2005, for example), and on scientifically unjustifiable differences in prescribing practice (e.g. regional differences in the use of medication, cf. Knopf/Melchert 2003).

Reflection on doctor-patient interaction: doctors should be encouraged to query the automatic prescribing of drugs or at least question certain wishes on the part of patients. Em-

[15] Compare the policy paper: Options for reducing the input of pharmaceuticals for human use and their residues or metabolites into raw and drinking water. Joint recommendation from the German Federal Environment Agency and the Institute for Social-Ecological Research; Status: February 2010.

pirical health research (e.g. Britten et al. 2000; Cockbourn/Pit 1997) proves that countless misunderstandings arise between patients and doctors during medical consultations. At the same time, doctor and patient reach a kind of implicit agreement to the effect that a medication will be prescribed at the end of the consultation. If the drug fails to achieve the desired improvement, the patient ends up feeling frustrated; if the prescription is merely a way of satisfying the patient's expectation, then the doctor feels frustrated in his or her professional capacity. The following quotation illustrates the misunderstandings that occur between doctor and patient, and the prescriptions resulting from them:

> "[...] because I keep having the same problem, and basically get prescribed antibiotics [...] My mother suggested her stuff [natural remedies], but he [the doctor] didn't mention it. And no matter how well educated you are – somehow you always trust the doctor. Maybe that's the problem." (Quotation from Focus Group 2, General Public, w, 30)

What is more, fewer prescriptions can also help reduce costs. So there is much in favour of tackling this problem and integrating it into a communication strategy. Such a sensitive topic must however be dealt with due caution.

Implications for practical implementation

➔ All measures addressed in this section must be seen within the context of modifications in the health system (e.g. cost reductions). They cannot be triggered by the communication strategy presented here but merely represent synergy effects via which the environmental influences of pharmaceuticals can be reduced.

There are, however, strong links with the Awareness Strategy (cf. Module 2) vis-à-vis

- the acceptance of non-drug forms of therapy by healthy funds and doctors,
- the critical, reflective approach towards the automatic prescribing of drugs, and
- the doctor-patient relationship.

4.5 Specific strategy for hospitals and clinics[16]

4.5.1 Background to the problem

Although the concentration of active ingredients is higher in sewage from hospitals than from domestic households, for example, the absolute quantity is virtually irrelevant. Studies show that emissions from clinics for the most active substances account for less than 3 to 5% of the total load (e.g. Kümmerer 2008; Schuster et al. 2008). Similar is true for diagnostics such as x-ray contrast agents. Since the pressure to rationalise is very much a driving force in hospitals, the unnecessary prescription of drugs tends to be less of an issue. Moreover, the clear-cut rules and work procedures in day-to-day hospital life mean that improper disposal of left-over drugs plays a minimal role, even if it cannot be ruled out altogether.

Drug residues from hospitals and clinics do not therefore enter the sewage system to a larger extent than is the case with domestic or urban sewage. This means that a communication strategy does not need to make this its focus.

Hospital network as a communication environment

Hospitals are professional businesses; but at the same time they constitute a social environment revolving around illness and health, and hence drugs. It is therefore easy to address various groups of people there. Hospitals can be sources of information on active pharmaceutical ingredients in the environment and the proper disposal of (expired) drugs. This involves the patient and the visitor on the one hand, and the nursing staff on the other, but also includes all kinds of non-medical workers such as technical and office employees.

Sustainability for the corporate image

The discussion concerning the problem of water pollution also holds entrepreneurial potential for hospitals. In communicating with patients, visitors and the workforce, there is scope for hospitals to position themselves as establishments with a duty towards sustainability, with a so-called Green Corporate Identity. The University Clinic of Freiburg is an example of such a strategy being used to create added value. After all, the outward portrayal of environmental aspects is becoming increasingly important for hospitals, too. In increasing staff awareness, it is possible to create a certain amount of productive overlap, as the issue can be discussed from various perspectives such as environmental management and occupational safety.

Hierarchies and professional mentality

The pronounced hierarchy existing in hospitals hampers the awareness-raising process and that of getting people to engage in the issue. Similar is true of the way that doctors are professionally organised. To date, it has been difficult to interest the medical profession in environmental issues for a number of reasons. One is that such topics do not exactly serve

[16] The information is based on an expert discussion with Prof. Dr. Klaus Kümmerer from the Institute of Environmental Medicine and Hospital Hygiene at the University Clinic of Freiburg in November 2009 along with focus groups with hospital doctors and hospital pharmacists, conducted in 2006 and 2009.

to further a career. The enhancement to image described above is a possible starting point from which to reach executive levels or the environmental commission responsible. There is however the possibility that the problem would be even more vehemently dismissed than amongst those doctors working in their own practices. Clinicians have far more to do with life-threatening diseases and could well be more inclined to see the environmental relevance of drugs as an inappropriate aspect extrinsic to the idea of healing.

As institutions of research and teaching, the university clinics do, however, play an important role. They are a multiplier capable of arousing scientific interest early on in people's medical careers. In the long term, teaching modules on the environmental impact of drugs could become embedded in medical training, for instance in infectiology, oncology and environmental medicine.

Hospitals provide a good platform for making the connection between the environmental relevance of active pharmaceutical ingredients and the handling of antibiotics. Appropriate deployment reduces the likelihood of resistance, something that is of fundamental importance to doctors and patients; in addition it reduces input into the environment.

Discerning pharmaceutical expertise and drug selection

In their working environment, hospital pharmacists often play the role of supplier rather than one of pharmaceutical expert. Moreover, many smaller hospitals no longer have their own clinical pharmacist and instead order from outside pharmacies. This reinforces the supplier aspect, making it even more difficult to communicate with pharmacists and involve them in an expert capacity. While the role of service provider is at odds with the self-image of independent pharmacists as described in Chapter 4.3., clinical pharmacists are probably less amenable to an active role as an advisor on the environmental effects of medication and the proper disposal thereof. They do not have the means of influencing hospital procedures in the desired direction – despite being aware and convinced of the need to do so. Another point of departure is that of including the issue in the study curricula for clinical pharmacy[17].

The pharmaceuticals prescribed in hospitals are selected by a dedicated pharmaceutical drugs commission. Its make-up varies depending on the hospital. This also applies to the binding character of the selection, i.e. whether doctors may be given other drugs on request or are indeed bound by the official list. Via these pharmaceutical drug commissions, one could get environmental aspects added to the current selection criteria such as cost reduction and drug variety. However, this is only possible if the members of the commissions are informed about the environmental properties of the individual drugs. This knowledge could

[17] "Clinical pharmacy is the branch of pharmacy that, based on scientific pharmaceutical knowledge, is concerned with optimising the use of drugs on and by the patient" (Definition of the German Pharmaceutical Society – DPhG, and the Federal Union of German Associations of Pharmacists – ABDA; see at http://www.klinische-pharmazie.org).

be imparted via a classification index[18] and through continuing training for doctors and pharmacists.[19]

Despite being repeatedly denied from various sides, the influence of the pharmaceutical industry on the selection of drugs remains significant, even in hospitals and clinics. However, many clinics are subjecting this exercising of influence to more stringent regulation by insisting that pharmaceutical representatives announce any visits and, in some cases, negotiate only with the hospital management itself.

Nursing and non-medical staff

The influence of nursing staff is somewhat minimal due to its position within the hospital hierarchy. On the other hand, it is the nurses who handle the drugs on a daily basis and who thus also contribute to the entry of active ingredients into the water system, albeit involuntarily. They hold a key position when it comes to everyday clinical measures for occupational safety and environmental management in the context of pharmaceuticals. We assume that nursing staff and pharmaceutical technicians are far less dismissive of the subject than doctors. These groups could, for instance, be made more aware of the issue via (internal) training schemes or information available on the intranet, etc. The top-down approach mentioned above (establishing the subject as an issue in the minds of the medical directors) can thus be supplemented by a bottom-up effect.

4.5.2 Practical implications for hospitals and clinics

As we see it, the following implications exist here:

- ➔ 'Green' image enhancement via corporate identity (CI): the decision for or against active environmental management as part of the CI represents an entrepreneurial positioning decision. It is unlikely to be influenced by awareness triggered by an actor such as the German Federal Ministry of the Environment or German Federal Environment Agency. Influencing opportunities are thus few and far between here.
- ➔ Strong hierarchies: awareness can only be increased in the long term, as proposed in the 'Awareness-raising of the medical profession' module (4.4.2). Clinicians do not differ in this respect from doctors in their own practices.
- ➔ University clinics and teaching hospitals fulfil an important multiplier function: this is where medical specialists become professionally socialised; in other words it is important in the long term to integrate the subject of the environmental impact of pharmaceuticals into their vocational training. The prerequisite for this, however, is similar to that for the awareness strategy: getting the medical umbrella organisations involved.
- ➔ Clinical pharmacists: their capacity for exerting influence is lower than independent pharmacists. By intensifying the clinical pharmacy side of pharmacy training, advice from clinical pharmacists can gain in importance. To this end, however, we recommend the same measures as for knowledge transfer and continuing education outlined in Chapter 4.3.2.

[18] The classification under discussion here can of course only be of an informative, voluntary and non-binding nature. The basic form of such a classification would be the domain of the Drug Commission of the German Medical Association.

[19] For example, use of the Swedish classification system has already been introduced in a Copenhagen clinic.

➔ The drugs commissions can be important actors when it comes to giving greater consideration to environmental aspects in selecting drugs from those available. Here we recommend first implementing the measures for raising awareness in the medical profession as described in Chapter 4.4.2.

➔ Nursing and non-medical staff play a key role in the daily handling of drugs, and are therefore important when it comes to recognition of the issue as such (bottom-up effect). However, since this occupational group is generally acknowledged to be over-worked, it remains doubtful whether nursing staff could take responsibility for disseminating this subject matter in the interests of a more sustainable organisation of their workplace.

Examples of contacts

– Verband der Leitenden Krankenhausärzte Germanys e.V., Düsseldorf
– Bundesverband Deutscher Krankenhausapotheker (ADKA) e.V., Stuttgart
– Krankenhauspharmazie, Zeitschrift des Bundesverbandes Deutscher Krankenhausapotheker (ADKA) e.V., Hg. Prof. Dr. Egid Strehl, Universitätsklinikum Freiburg
– Deutscher Berufsverband für Pflegeberufe (DBFK), Berlin

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[20] Neither the German Federal Environmental Agency nor ISOE assumes responsibility for the content of any third-party websites accessed via links. The linked content is viewed and evaluated on a spot-check basis only. The continuous checking of content is neither intended nor possible. The German Federal Environmental Agency and ISOE expressly distance themselves from any content that might infringe against criminal or liability laws, or which violates public decency.

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Annex_55_CAN (Vancouver Coastal Health Department)
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Annex_56-57_AUS (Return Unwanted Medicines)
http://www.returnmed.com.au/userfiles/file/RUM_Brochure.pdf

Prescription Drug and Personal Care Product Disposal

Medication Collection Instructions:

1. Gather your unwanted medications.
2. Leave items in their original containers. Pill bottles, blister packs, ointment tubes, and leak-proof liquid containers are all acceptable.
3. Remove any personal information on the label, but make sure the drug name is still visible.
4. Take medications to a participating pharmacy, and deliver the medications to the pharmacy counter.

Unacceptable Items:

Narcotics/DEA Scheduled/Controlled Drugs
Sunscreen Products
Insect Repellants
Cosmetics
Tobacco Products
Hair Care Products
Personal Care Products
Radioactive Items
Business Waste
Hydrogen Peroxide, Rubbing Alcohol, etc.
Aerosol Cans
IV Bags
Sharps/Needles (unless pharmacy approves)
Bloody or Infectious Waste
Empty Containers

Acceptable Items:

Non-Controlled DEA Drugs
Medication Samples
Prescription Medications
Over-the-counter Medications
Medicated Ointments/Lotions
Antibiotics
Steroids
Cold and Flu Medications
Vitamins
Medications for Pets
Inhalers

Participating Locations:

Busch's Ann Arbor - Green Rd.
Busch's – Dexter
Busch's – Saline
Dexter Pharmacy
Pharmacy Solutions, Inc.
St. Joseph Mercy Pharmacy – Reichert
ChelseaCare Pharmacy/St. Joseph Mercy
The Prescription Shop II
Village Pharmacy II
Wenk's - Prescription Shop
Walgreens

For more information, please visit: www.dontflushdrugs.com

Washtenaw County Water Resources Commissioner's Office

Washtenaw County Environmental Health

DO NOT FLUSH!

Help Protect Washtenaw County's Waterways

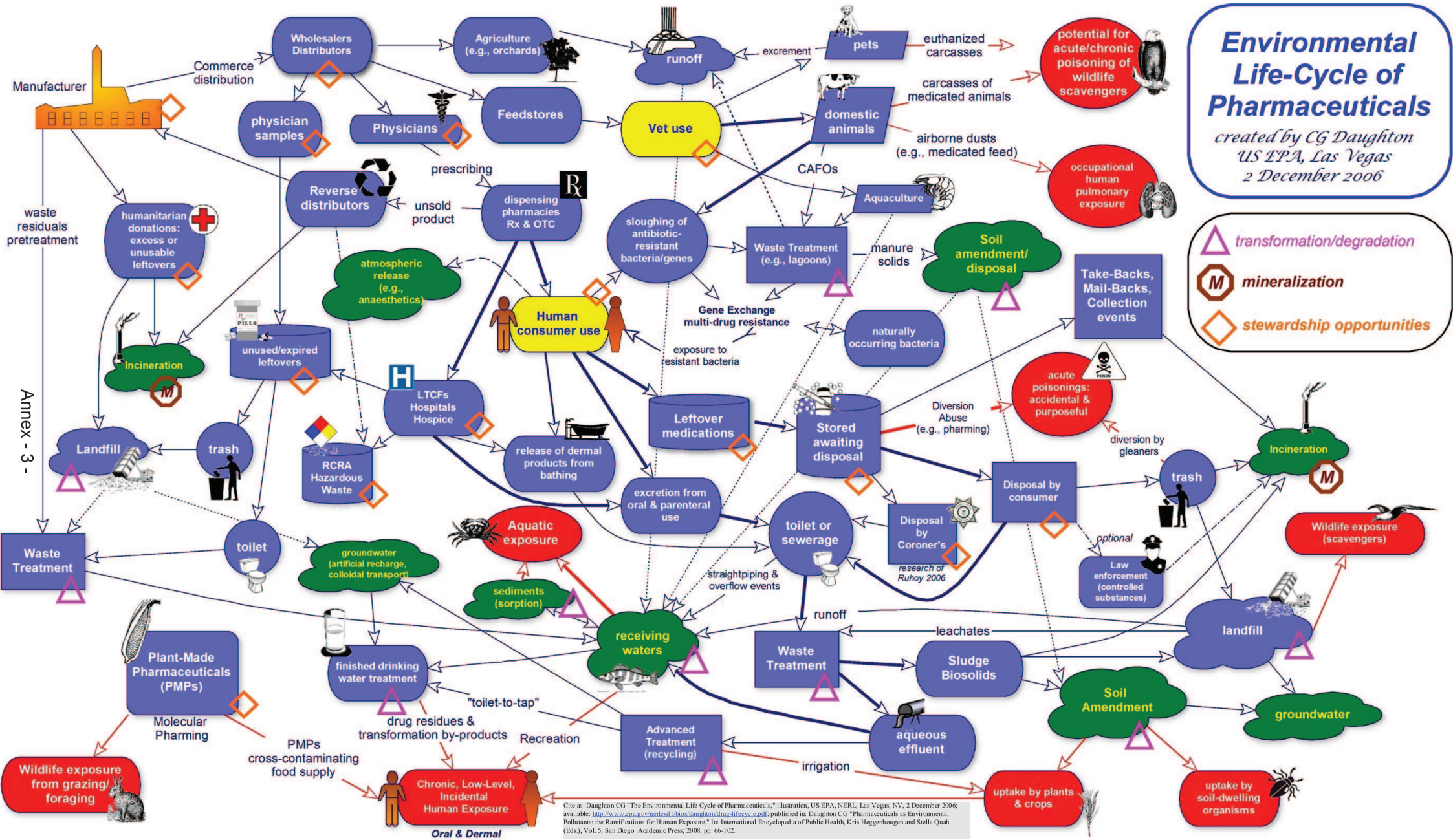
Do not Flush or Pour Unwanted Medications Down the Toilet or Drain

- If Directed, Take All the Pills in your Prescription
- Mix Liquid Medication with a Bitter Tasting Additive or Cat Litter
- Properly Seal Medications with Tape
- Obliterate Personal Information
- Double Wrap in Opaque Bags, Secure, and Throw in the Trash
- Utilize Local Pharmacy Take Back Programs

www.dontflushdrugs.com
734.222.3950

For More Information Call: 734.222.6860 or Visit
http://www.ewashtenaw.org/government/drain_commissioner/

Washtenaw County Water Resources
Commissioner's Office



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Proper Disposal of Prescription Drugs

Office of National Drug Control Policy 2009

Federal Guidelines:

- Do not flush prescription drugs down the toilet or drain unless the label or accompanying patient information specifically instructs you to do so. For information on drugs that should be flushed visit the FDA's website.

- To dispose of prescription drugs not labeled to be flushed, you may be able to take advantage of community drug take-back programs or other programs, such as household hazardous waste collection events, that collect drugs at a central location for proper disposal. Call your city or county government's household trash and recycling service and ask if a drug take-back program is available in your community.

- If a drug take-back or collection program is not available:

1. Take your prescription drugs out of their original containers.

2. Mix drugs with an undesirable substance, such as cat litter or used coffee grounds.

3. Put this mixture into a disposable container with a lid, such as an empty margarine tub, or into a sealable bag.

4. Conceal or remove any personal information, including Rx number, on the empty containers by covering it with black permanent marker or duct tape, or by scratching it off.

5. Place the sealed container with the mixture, and the empty drug containers, in the trash.

Office of National Drug Control Policy
750 17th St. NW, Washington, D.C. 20503
p (202) 395-6618 f (202) 395-6730

Why Be Concerned?

- The U.S. Geological Survey found that 80% of the watersheds they sampled nationally contained low levels of at least one type of pharmaceutical chemical, with half of the streams containing seven or more.
- Wastewater treatment facilities are not equipped to filter these chemicals out, so many drugs and other compounds are being detected in drinking water.
- The effects of most of these products are unknown, but increased concentrations of antibiotics have produced "super bugs"; bacteria that are resistant to antibiotics.

- The risks of long-term exposure of these substances to humans, animals and ecosystems are unknown.
- Previous information campaigns encouraged consumers to "flush" excess pharmaceuticals, but these substances end up in our drinking water.
- There is currently no national guidance for the proper disposal of PPCPs. The guidelines in this brochure offer safe disposal methods that protect water quality and human health.

GETTING HELP

Washtenaw County Drain
Commissioner's Office ..... (734) 222-6833
or (734) 994-2525

Washtenaw County
Home Toxics Program ..... (734) 222-3950

Michigan Department of
Environmental Quality ..... (800) 662-9278

See the Washtenaw County website at **www.ewashtenaw.org**

For other information about water quality issues, please see "The Homeowner's Handbook: A Guide to Water Quality Protection for Homeowners Associations and Households."

OFFICE OF THE WASHTENAW COUNTY
DRAIN COMMISSIONER
P.O. Box 8645
705 N. ZEEB ROAD
ANN ARBOR, MI 48107-8645
(734) 222-6833

Autumn 2006
printed on recycled paper

Prescription Drug and Personal Care Product Disposal

Janis A. Bobrin
Office of the Washtenaw
County Drain Commissioner

Proper Disposal of Drugs and Personal Care Products

If you are instructed to do so by your physician, finish the prescription. For any unused portion of the prescription or other health care product, follow the disposal steps below. Remember to first black-out any personal information on the label to protect privacy, but ensure the drug name is still visible. At present, there are few, if any "take back" programs for prescription drugs. Call your local pharmacy to confirm information on the disposal of prescription drugs.

Capsules and Tablets in Containers

- Secure the cap on the bottle.
- Cover the cap with duct tape, fully sealing the container to prevent breaking or leakage.
- Double wrap the sealed containers in opaque plastic bags. Tightly tie or secure the bags with duct tape to prevent leakage and place in the trash.

Blister-Packaged Capsules and Tablets

- Wrap package with several layers of duct tape, allowing visibility of the product name. This will prevent blister packs from breakage.
- Double bag the sealed packs in opaque plastic bags. Tightly tie or secure the bags with duct tape to prevent leakage and place in the trash.

Ampules, Vials, and Needles

- Do not open or alter the original contents if possible.
- Call the Washtenaw County 24 hour home toxics hotline (734) 222-3950 for information and drop off hours at 705 N. Zeeb Road. Also check the *Turning Trash to Treasure* guide on www.ewashtenaw.org for a pharmacy drop off location near you.
- Residents outside Washtenaw County should call their Solid Waste Department or Waste Hauling Services for instructions on proper disposal.

Liquid PPCPs

- Seal the container with duct tape to prevent leaks and breakage.
- To take maximum precautions, add salt, a pungent spice such as nutmeg or mustard, or a bitter tasting additive. Kitty litter, sawdust or an absorbing agent can also be added to the liquid to repel animals.
- Double bag the sealed containers in opaque plastic bags. Tightly tie or secure the bags with duct tape to prevent leakage and place in the trash.

Disposal of Home Pharmaceuticals

Step 1. Remove the medications from the pill bottle and put them in a container with a lid or into a sealable baggie. Try not to handle the medications. If the medication is solid, crush it or add water to dissolve it.

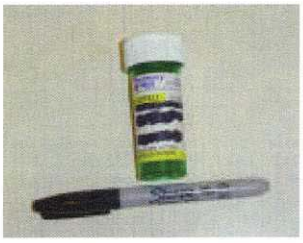
OR

Step 2. Mix in something to make medications "undesirable" (kitty litter, coffee grounds) to pets and children.

As an added safety precaution, place the baggie in another sealable container.

Step 3.
Throw in trash

Step 4. Remove or cover identifying info on pill bottle before discarding.



Remember!

Please do not dispose of medications to the sink or toilet!

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

THANK YOU for helping to keep Virginia waters clean!

NYS Department of Environmental Conservation
NYS Education Department

IMPORTANT MESSAGE

Help Protect New York's Waters

Don't Flush Unwanted Household Medications or Pour Them Down the Drain

Return to collection events where available

or

Mix with something undesirable such as coffee grounds, cat litter or dirt

Tape up containers

Toss in your garbage

For full instructions or designated collection events visit:

www.dontflushyourdrugs.net

What's the Issue?

Safe methods of disposal are needed for expired or unwanted medicines. Products of concern include prescription and over-the counter medications. Improper disposal of medicines presents both a public safety and environmental hazard and wastes millions of health care dollars annually.[1]

Why is Medicine Disposal a Concern?

The three main hazards are:

1. Possible poisoning from accidental ingestion, particularly among young children and pets, if medicines are thrown in the trash.

2. Illegal use or theft, including identity theft, from discarded containers providing personal patient information.

3. Contamination of water resources, which can result in reproductive and developmental problems in fish and other aquatic wildlife if medicines are flushed or placed in the trash.

1 Daughton, C. (2003). "Cradle to Cradle Stewardship of Drugs for Minimizing Their Environmental Disposition While Promoting Human Health—Rationale for and Avenues Toward a Green Pharmacy". Environmental Health Perspectives. 111 (5): 757-774.

Other Resources

- *Disposal of Unwanted Medicines* resource kit from IL-IN Sea Grant
  www.iisgcp.org/unwantedmeds

Sea Grant
ILLINOIS - INDIANA

- U.S. Environmental Protection Agency the potential environmental impacts of pharmaceuticals:
  www.epa.gov/ppcp
- U.S. Geological Survey research on the presence of pharmaceuticals in the environment:
  http://toxics.usgs.gov/regional/emc/
- U.S. Fish & Wildlife Service & the American Pharmacists Association SMARxT Disposal Website:
  http://smarxtdisposal.net

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Unused and Expired Medications

How to reduce pollution and prevent poisoning

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Medication Collection Drive

How do Pharmaceuticals Enter the Environment?

Pharmaceuticals have been found primarily in discharge from wastewater treatment plants and surface waters. Pharmaceuticals are also released into waterways via runoff from commercial animal feeding operations and aquaculture, and from fields where manure and biosolids have been applied.

How Can Medications Impact the Environment?

Expired or unwanted medicines, if flushed down the toilet or drain, are a source of pollution in wastewater. Because sewage treatment plants are not designed to deal with drugs, these chemicals can be released into streams, lakes, and groundwater and affect fish and other aquatic wildlife.

You might imagine that any substance safe enough for humans and pets to ingest as medication can't cause environmental harm. But that may not be the case. If our medicines are reaching streams, rivers, and lakes, organisms living in these habitats may be *continuously* exposed to these drugs. Some aquatic organisms living in waters downstream from wastewater treatments plants are showing signs of developmental and reproductive problems. Researchers are working to determine whether pharmaceuticals are causing these effects.

Did You Know?

- 90% of consumers dispose of unused medicines down the toilet or in the trash.
- Prescription drugs are now the number one drug used by teenagers.
- 78,000 children per year under age five are treated for accidental medication poisoning in the U.S.
- The U.S.Geological Survey surveyed 139 streams across 30 states and found 80% of water samples contained residues of prescription and non-prescription drugs.

Disposal Dos and Don'ts

Do:

1. Take your unused/unwanted/ expired medications to the Keep Northern Illinois Beautiful Medication Collection Drive.

2. Use a permanent marker to black out your name and personal information on the label, but leave medication information legible.

3. Please follow directions at the drop-off site. Only give medications to drop-off site personnel.

4. Leave all medications in original packaging.

Do Not:

1. Flush down the sink or drain.
2. Place in the trash.
3. Give or sell to others.

How Can I Reduce the Quantity of Unwanted Medications in my Home?

1. Purchase only as much as you need and take the medication as prescribed by your physician.

2. Centralize all medications in one location secured from children and pets. This may help to limit inadvertent over-purchasing of products you already have.

3. In order to preserve the quality of your medicines, store medications at proper temperature and humidity as recommended on the label. This is sometimes NOT in the bathroom medicine cabinet.

4. Say "No" to physician samples if you are not going to use them.

EVERY DAY IS EARTH DAY

How to Dispose of Unused Medicines

Is your medicine cabinet filled with expired drugs or medications you no longer use? How should you dispose of them?

Most drugs can be thrown in the household trash, but consumers should take certain precautions before tossing them out, according to the Food and Drug Administration (FDA). A few drugs should be flushed down the toilet. And a growing number of community-based "take-back" programs offer another safe disposal alternative.

Guidelines for Drug Disposal

FDA worked with the White House Office of National Drug Control Policy (ONDCP) to develop the first consumer guidance for proper disposal of prescription drugs. Issued by ONDCP in February 2007, the federal guidelines are summarized here:

- Follow any specific disposal instructions on the drug label or patient information that accompanies the medication. Do not flush prescription drugs down the toilet unless this information specifically instructs you to do so.

- If no instructions are given, throw the drugs in the household trash, but first:
  - Take them out of their original containers and mix them with an undesirable substance, such as used coffee grounds or kitty litter. The medication will be less appealing to children and pets, and unrecognizable to people who may intentionally go through your trash.
  - Put them in a sealable bag, empty can, or other container to prevent the medication from leaking or breaking out of a garbage bag.

Take drugs out of their original containers and mix them with an undesirable substance, such as used coffee grounds ...

Photo Illustration: FDA/Michael Ermarth

- Take advantage of community drug take-back programs that allow the public to bring unused drugs to a central location for proper disposal. Call your city or county government's household trash and recycling service (see blue pages in phone book) to see if a take-back program is available in your community.

FDA's Director of Pharmacy Affairs, Ilisa Bernstein, Pharm.D., J.D., offers some additional tips:

- Before throwing out a medicine container, scratch out all identifying information on the prescription label to make it unreadable. This will help protect your identity and the privacy of your personal health information.

- Do not give medications to friends. Doctors prescribe drugs based on a person's specific symptoms and medical history. A drug that works for you could be dangerous for someone else.

- When in doubt about proper disposal, talk to your pharmacist.

Bernstein says the same disposal methods for prescription drugs could apply to over-the-counter drugs as well.

Why the Precautions?

Disposal instructions on the label are part of FDA's "risk mitigation" strategy, says Capt. Jim Hunter, R.Ph., M.P.H., Senior Program Manager on FDA's Controlled Substance Staff. When a drug contains instructions to flush it down the toilet, he says, it's because FDA, working with the manufacturer, has determined this method to be the most appropriate route of disposal that presents the least risk to safety.

About a dozen drugs, such as powerful narcotic pain relievers and other controlled substances, carry instructions for flushing to reduce the danger of unintentional use or overdose and illegal abuse.

For example, the fentanyl patch, an adhesive patch that delivers a potent pain medicine through the skin, comes with instructions to flush used or leftover patches. Too much fentanyl can cause severe breathing problems and lead to death in babies, children, pets, and even adults, especially those who have not been prescribed the drug. "Even after a patch is used, a lot of the drug remains in the patch," says Hunter, "so you wouldn't want to throw something in the trash that contains a powerful and potentially dangerous narcotic that could harm others."

Environmental Concerns

Despite the safety reasons for flushing drugs, some people are questioning the practice because of concerns about trace levels of drug residues found in surface water, such as rivers and lakes, and in some community drinking water supplies. However, the main way drug residues enter water systems is by people taking medications and then naturally passing them through their bodies, says Raanan Bloom, Ph.D., an Environmental Assessment Expert in FDA's Center for Drug Evaluation and Research. "Most drugs are not completely absorbed or metabolized by the body, and enter the environment after passing through waste water treatment plants."

A company that wants FDA to approve its drug must submit an application package to the agency. FDA requires, as part of the application package, an assessment of how the drug's use would affect the environment. Some drug applications are excluded from the assessment requirement, says Bloom, based on previous agency actions.

"For those drugs for which environmental assessments have been required, there has been no indication of environmental effects due to flushing," says Bloom. In addition, according to the Environmental Protection Agency, scientists to date have found no evidence of adverse human health effects from pharmaceutical residues in the environment.

Nonetheless, FDA does not want to add drug residues into water systems unnecessarily, says Hunter. The agency is in the process of reviewing all drug labels with disposal directions to assure that the recommended methods for disposal are still appropriate.

Another environmental concern lies with inhalers used by people who have asthma or other breathing problems, such as chronic obstructive pulmonary disease. Traditionally, many inhalers have contained chlorofluorocarbons (CFC's), a propellant that damages the protective ozone layer. The CFC inhalers are being phased out and replaced with more environmentally friendly inhalers.

Depending on the type of product and where you live, inhalers and aerosol products may be thrown into household trash or recyclables, or may be considered hazardous waste and require special handling. Read the handling instructions on the label, as some inhalers should not be punctured or thrown into a fire or incinerator. To ensure safe disposal, contact your local trash and recycling facility. FDA

This article appears on FDA's Consumer Health Information Web page (*www.fda.gov/consumer*), which features the latest on all FDA-regulated products. Sign up for free e-mail subscriptions at *www.fda.gov/consumer/consumerenews.html*.

For More Information

Proper Disposal of Prescription Drugs Fact Sheet and Video Clip
www.ondcp.gov/drugfact/factsht/proper_disposal.html

SMARxT Disposal Campaign
www.smarxtdisposal.net

Albuterol Inhalers: Time to Transition
www.fda.gov/consumer/updates/albuterol053008.html

How to Dispose of Unwanted Medications

Expired or unwanted prescription and over-the-counter medications from households should never be disposed of by flushing them down the toilet or a drain. Although this method of disposal prevents accidental ingestion, it can cause contamination to Florida's aquatic environment because wastewater treatment systems are not designed to remove many of these medications.

Seven Steps to Safety

Please use these practical guidelines when disposing of prescription and over-the-counter medicines:

For Pills and Liquids:

1. Keep the medicines in the original container. This will help identify the contents if they are accidentally ingested.
2. Mark out your name and prescription number for safety.
3. For pills: add some water or soda to start dissolving them
   For liquids: add something inedible like cat litter, dirt or cayenne pepper.
4. Close the lid and secure with duct or packing tape.
5. Place the bottle(s) inside an opaque (non see-through) container like a coffee can or plastic laundry bottle.
6. Tape that container closed.
7. Hide the container in the trash. Do not put in the recycle bin.

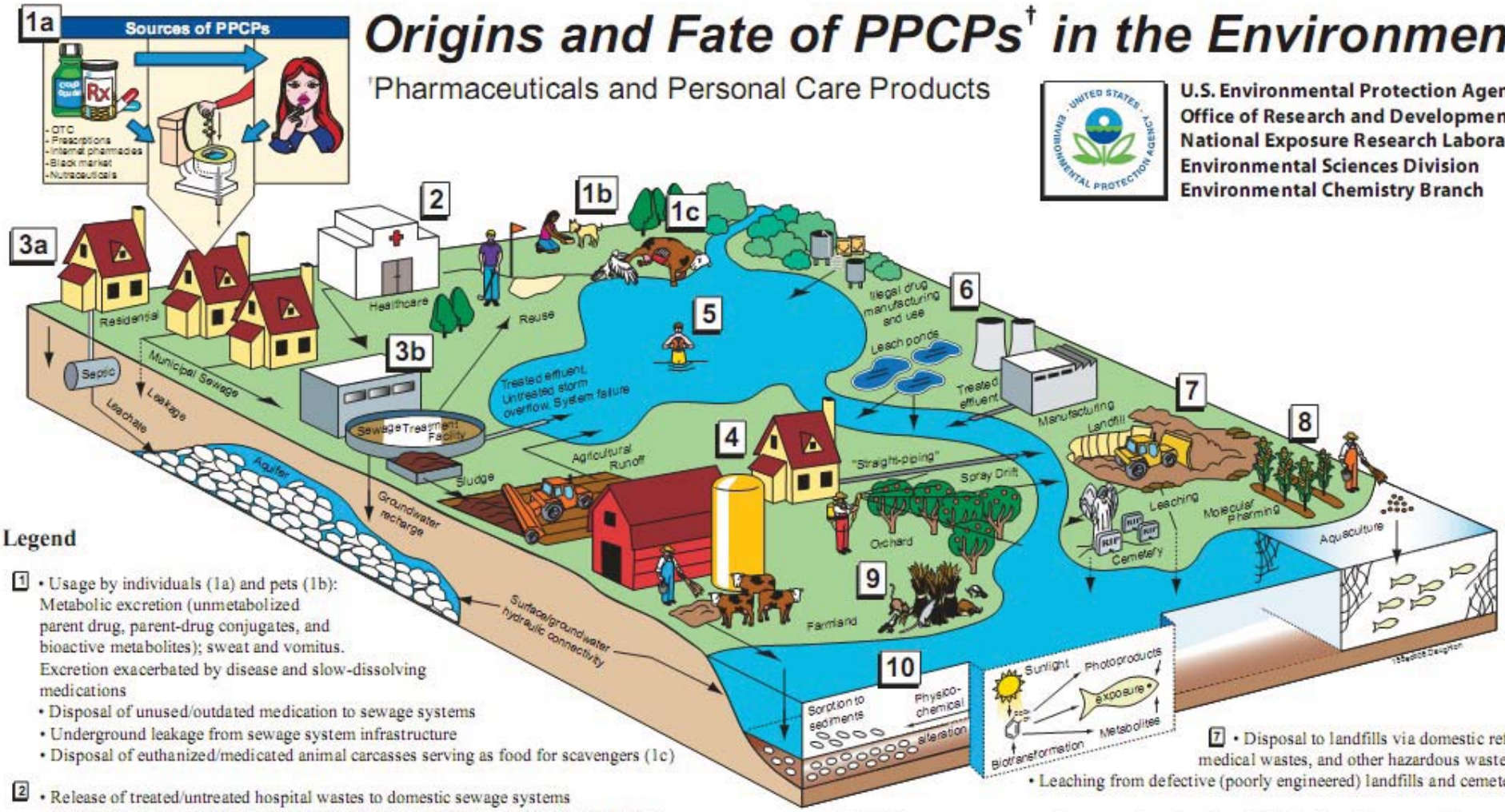
Don't Flush That Leftover Medicine

Florida Department of Environmental Protection
3900 Commonwealth Boulevard
Tallahassee, Florida 32399
850.245.8707
www.dep.state.fl.us

Origins and Fate of PPCPs† in the Environment

†Pharmaceuticals and Personal Care Products

U.S. Environmental Protection Agency
Office of Research and Development
National Exposure Research Laboratory
Environmental Sciences Division
Environmental Chemistry Branch



Legend

1 • Usage by individuals (1a) and pets (1b): Metabolic excretion (unmetabolized parent drug, parent-drug conjugates, and bioactive metabolites); sweat and vomitus. Excretion exacerbated by disease and slow-dissolving medications
• Disposal of unused/outdated medication to sewage systems
• Underground leakage from sewage system infrastructure
• Disposal of euthanized/medicated animal carcasses serving as food for scavengers (1c)

2 • Release of treated/untreated hospital wastes to domestic sewage systems (weighted toward acutely toxic drugs and diagnostic agents, as opposed to long-term medications); also disposal by pharmacies, physicians, humanitarian drug surplus

3 • Release to private septic/leach fields (3a)
• Treated effluent from domestic sewage treatment plants discharged to surface waters, re-injected into aquifers (recharge), recycled/reused (irrigation or domestic uses) (3b)
• Overflow of untreated sewage from storm events and system failures directly to surface waters (3b)

4 • Transfer of sewage solids ("biosolids") to land (e.g., soil amendment/fertilization)
• "Straight-piping" from homes (untreated sewage discharged directly to surface waters)
• Release from agriculture: spray drift from tree crops (e.g., antibiotics)
• Dung from medicated domestic animals (e.g., feed) - CAFOs (confined animal feeding operations)

5 • Direct release to open waters via washing/bathing/swimming

6 • Discharge of regulated/controlled industrial manufacturing waste streams
• Disposal/release from clandestine drug labs and illicit drug usage

7 • Disposal to landfills via domestic refuse, medical wastes, and other hazardous wastes
• Leaching from defective (poorly engineered) landfills and cemeteries

8 • Release to open waters from aquaculture (medicated feed and resulting excreta)
• Future potential for release from molecular pharming (production of therapeutics in crops)

9 • Release of drugs that serve double duty as pest control agents:
examples: 4-aminopyridine, experimental multiple sclerosis drug → used as avicide; warfarin, anticoagulant → rat poison; azacholesterol, antilipidemics → avian/rodent reproductive inhibitors; certain antibiotics → used for orchard pathogens; acetaminophen, analgesic → brown tree snake control; caffeine, stimulant → *coqui* frog control

10 Ultimate environmental transport/fate:
• most PPCPs eventually transported from terrestrial domain to aqueous domain
• phototransformation (both direct and indirect reactions via UV light)
• physicochemical alteration, degradation, and ultimate mineralization
• volatilization (mainly certain anesthetics, fragrances)
• some uptake by plants
• respirable particulates containing sorbed drugs (e.g., medicated-feed dusts)

Christian G. Daughton, U.S. EPA-Las Vegas

March 2006
(original February 2001)

http://epa.gov/nerlesd1/chemistry/pharma/images/drawing.pdf
from: http://epa.gov/nerlesd1/chemistry/pharma/

Learn More About ...

If you would like more information about pharmaceutical disposal, you may want to visit some of these links:

There are new federal guidelines for the proper disposal of unused, unneeded, or expired prescription drugs.
http://whitehousedrugpolicy.gov/news/press07/022007.html

The United States Geological Survey (USGS) has gathered sampling data that confirms the presence of pharmaceuticals in aquatic and terrestrial environments.
http://toxics.usgs.gov/regional/emc.html

The United States Environmental Protection Agency (EPA) has compiled information on potentially negative environmental impacts.
www.epa.gov/nerlesd1/chemistry/pharma

Wastewater Agencies in the Los Angeles, Orange County, and San Diego area sponsored a "No Drugs Down the Drain" initiative.
www.nodrugsdownthedrain.org

The Partnership for a Drug-Free America informs parents, young adults and teens of the very real risks of misusing medicine, *"Prescription Medicine Abuse: A Growing Problem."*
www.drugfree.org/Parent/Resources/Prescription_Medicine_Misuse

For residents of Tempe, AZ, The Household Products Collections Center for the City of Tempe collects and disposes of household hazardous wastes, including medicines. You must have proof of Tempe residency to use this service.
www.tempe.gov/hhw/we_accept.htm

Contacts for Further Information

ADEQ Arizona Department of Environmental Quality
Janet Napolitano, Governor
Stephen A. Owens, ADEQ Director

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(602) 771-4829 (Hearing impaired)
Web site: azdeq.gov

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ADEQ Arizona Department of Environmental Quality
Janet Napolitano, Governor
Stephen A. Owens, ADEQ Director

Prescription Drug Disposal...

A Pain in the Drain

No Drugs Down the Drain

If you're like most people, you have accumulated a collection of prescription drugs and other pharmaceuticals that are no longer needed. Once it was common practice to flush these medications down the toilet.

We now know that some of these substances are bad for our environment. The drugs may pass through sewage treatment plants and septic tanks into surface waters, soils, and the groundwater. The federal government has released new guidelines which are designed to reduce the diversion of prescription drugs while also protecting the environment.

New Federal prescription drug disposal guidelines urge you to:

- Take unused, unneeded or expired prescription drugs out of their original containers.
- Mix the prescription drugs with an undesirable substance like coffee grounds or kitty litter, and put them in impermeable, nondescript containers such as empty cans or sealable bags, further ensuring that the drugs are not diverted or accidentally ingested by children or pets.
- Throw these containers in the trash.
- Flush prescription drugs down the toilet only if the accompanying patient information specifically instructs that it is safe to do so.
- Return unused, unneeded or expired prescription drugs to pharmaceutical take-back locations for safe disposal.

Facts About Prescription Drug Disposal

- Drugs can be scavenged and illegally sold, or could poison children and animals.
- Unused medications improperly disposed of can harm you and your environment.
- When drugs are flushed, they may not be broken down by the sewage treatment facilities and septic tank systems and can enter the soil, surface water and groundwater.
- Research studies have shown that exposure to drugs found in waterways is having a serious, negative impact on fish and other aquatic life.
- Pollution prevention - the elimination or minimization of the pollution source - is preferable to cleaning up the environment. Thereby minimizing both public cost and human and ecological exposure.

Why Should I Take the Time To Do This?

Properly disposing of unwanted medications may be inconvenient, but there are some very compelling reasons to do this in a safe and responsible manner.

- ***It's your environment – Please don't flush!***
  Drugs that are flushed down the toilet may pass through sewage treatment plants and septic tanks. These substances are released into waterways with the waste water which can lead to adjacent soil and ground water. Similarly, septic tanks systems may release the pharmaceuticals directly into the soil and eventually into the groundwater.
- ***Abuse is prevalent!***
  Abuse of prescription drugs, particularly painkillers, has increased among teenagers and young adults due to the ease of obtaining drugs. Sixty per cent of the persons who abuse painkillers indicated that they received the drugs free from friends or relatives.
- ***You can make a difference!***
  Children, pets or scavenging animals could find the medication and ingest it. Drugs could be scavenged and illegally sold. Take action to minimize the threat of accidental poisoning or drug abuse. Let's take precautions now to avoid harm to future generations and the environment. Your participation is appreciated!

Altmedikamente

Information zur „richtigen Sammlung und Entsorgung“

Vorsicht!

Altmedikamente (Medikamente, die als Abfall anfallen, wie z.B. Salben, Tropfen, Tabletten) können grundsätzlich Substanzen enthalten, die bei unsachgemäßer Entsorgung zu einer Gefährdung von Menschen und Umwelt führen. Während in der Vergangenheit vor allem Schwermetalle enthalten waren (z.B. blei- oder zinkhaltige Salben, quecksilberhaltige Tropfen) werden heute in der Chemotherapie Medikamente mit Zellgiften (Zytostatika), eingesetzt.

Rückgabe bei den Altstoff- und Problemstoffsammelstellen oder Apotheken.

Entsorgung über die Restmülltonne verboten!

Entsorgung über die Kanalisation verboten!

Die Sammlung!

Altmedikamente müssen getrennt gesammelt werden und dürfen keinesfalls in den Restmüll gelangen! Während Altmedikamente aus medizinischen Einrichtungen (z.B. Spitäler, Arztpraxen, Pflegeeinrichtungen) direkt über dazu berechtigte Abfallsammler entsorgt werden müssen, werden Altmedikamente aus Haushalten (Medikamente, die im Haushalt als Abfall anfallen) grundsätzlich über die Altstoff- und Problemstoffsammelstellen der Gemeinden oder über die Apotheken gesammelt.
Falls Altmedikamente mit gefahrenrelevanten Eigenschaften im Haushalt anfallen (schwermetallhaltige Medikamente oder Zytostatika), müssen diese über die Apotheken oder andere medizinische Einrichtungen entsorgt werden. In den Altstoff- und Problemstoffsammelstellen der Gemeinden können gefährliche Altmedikamente nicht von den in Haushalten üblichen **nicht** gefährlichen Altmedikamenten unterschieden werden (keine Kennzeichnung). Die richtige Zuordnung kann nur vom Arzt oder Apotheker vorgenommen werden!

! TIPP: Nutzen Sie diese Möglichkeiten und befragen Sie Ihren Arzt oder Apotheker bereits bei Rezeptausstellung oder Medikamentenübernahme über die richtige Entsorgung!

Fachabteilung 19D
Abfall- und Stoffflusswirtschaft

Das Land Steiermark

Die Sammlung und Entsorgung von Altmedikamenten aus privaten Haushalten!

Bei den Altstoff- und Problemstoffsammelstellen der Gemeinden:

- Die Übernahme erfolgt ausschließlich während der Öffnungszeiten; keine Sammlung über öffentlich zugängliche Sammelbehälter (z.B. Sammelinseln); keine Sammlung mit dem Restmüll!
- Anlieferung ohne Kartonschachteln und Beipacktexte (Entsorgung als Altpapier). Das Sammelstellenpersonal nimmt keine weitere Sortierung der Altmedikamente vor!
- Lagerung in flüssigkeitsdichten und verschließbaren Gebinden (z.B. Kunststofffässer mit Spannring).
- Kennzeichnung der Gebinde mit der Abfall-Schlüssel-Nummer **53501** und der Abfallbezeichnung **Arzneimittel, nicht wassergefährdend, ohne Zytostatika**.
- Weitergabe als nicht gefährlicher Abfall an einen befugten Abfallsammler (Entsorger). Dabei hat der übernehmende Entsorger auf dem Übergabenachweis (z.B. Lieferschein) die Übernahme zur thermischen Behandlung in einer dafür genehmigten Verbrennungsanlage zu bestätigen.
- Bei Übernahme von Altmedikamenten aus der Apothekensammlung ist ein Übergabenachweis auszustellen (siehe nachfolgendes Beispiel).

ÜBERGABENACHWEIS:
(nach den Anforderungen der Abfallnachweisverordnung BGBl. II Nr. 618/2003)

Die Gemeinde (Name und Anschrift der Gemeinde), als Betreiber des Altstoff- und Problemstoffsammelzentrums (Anschrift des Altstoff- und Problemstoffsammelzentrums), bestätigt die Übernahme von (Menge der Altmedikamente) kg Altmedikamente (**SN 53501 Arzneimittel, nicht wassergefährdend, ohne Zytostatika** nach den Vorgaben der ÖNORM S 2100) von (Name und Anschrift der Apotheke).
Der Übergeber bestätigt die Herkunft der Altmedikamente aus privaten Haushalten, die Vorsortierung und deren Zuordnung zu den nicht gefährlichen Abfällen!

_____
Stempel und Unterschrift des Übergebers!

_____
Stempel und Unterschrift des Übernehmers!

Bei den Apotheken:

- Die Übernahme erfolgt ausschließlich während der Öffnungszeiten; keine Sammlung über öffentlich zugängliche Sammelbehälter (z.B. Sammelinseln)!
- Aussortierung und getrennte Lagerung der Altmedikamente, die aufgrund ihrer Inhaltsstoffe gefahrenrelevante Eigenschaften aufweisen! Dazu kann auch die Medikamentenbezeichnung bzw. der Beipacktext herangezogen werden!
- Entfernung der Kartonschachteln und Beipacktexte (Altpapier)!
- Getrennte Lagerung der Altmedikamente mit bzw. ohne gefahrenrelevante Eigenschaften in flüssigkeitsdichten und verschließbaren Gebinden (z.B. Kunststofffässer mit Spannring).
- Kennzeichnung der Gebinde mit der Abfall-Schlüssel-Nummer **53501** und der Abfallbezeichnung **Arzneimittel, nicht wassergefährdend, ohne Zytostatika** bzw. der Abfall-Schlüssel-Nummer **53510** und der Abfallbezeichnung **Arzneimittel, wassergefährdend, schwermetallhaltig (z.B. Blei, Cadmium, Zink, Quecksilber, Selen), Zytostatika und unsortierte Arzneimittel**.
- Weitergabe als nicht gefährlicher bzw. gefährlicher Abfall an einen befugten Abfallsammler (Entsorger). Dabei hat der übernehmende Entsorger auf dem Übergabenachweis (z.B. Lieferschein bzw. Begleitschein) die Übernahme zur thermischen Behandlung in einer dafür genehmigten Verbrennungsanlage zu bestätigen.

HINWEIS:
Apotheken können aus privaten Haushalten übernommene und vorsortierte Altmedikamente, die der Abfallschlüsselnummer 53501 (nicht gefährliche Abfälle) entsprechen, an die Gemeinden übergeben. Im Sinne der bereits bisher üblichen Praxis besteht auch zukünftig die Empfehlung des Landes Steiermark, dass die Betreiber der Altstoff- und Problemstoffsammelzentren diese Altmedikamente aus privaten Haushalten kostenlos übernehmen. Dabei hat die Apotheke auf dem ÜBERGABENACHWEIS (z.B. Lieferschein) die ausschließliche Herkunft der Altmedikamente aus Haushaltsvorsammlungen, die Vorsortierung und deren Zuordnung zu den nicht gefährlichen Abfällen (SN 53501) zu bestätigen! Altbestände an Altmedikamenten der Apotheken werden von den Altstoff- und Problemstoffsammelzentren jedenfalls nicht übernommen (diese sind von der Apotheke über einen privaten Abfallsammler direkt zu entsorgen)!

Nähere Informationen zur Abfallwirtschaft in der Steiermark sowie die Möglichkeit das Dokument herunterzuladen unter:

http://www.abfallwirtschaft.steiermark.at

Medieninhaber und Herausgeber: Amt der Steiermärkischen Landesregierung, Fachabteilung 19D Abfall- und Stoffflusswirtschaft,
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October 30, 2008

"What to do with your unused medicines"

As part of our product stewardship program, sanofi-aventis is committed to encouraging proper disposal of unused medicines. Actions to reduce improper disposal of expired or unwanted prescription and non-prescription medicines would contribute to protection of our waterways. Although studies have indicated that only a small portion of medicines enter the environment through waste disposal, it is important to reduce our impact from all sources. Simple steps taken by the consumer will significantly reduce emissions contributing to environmental exposure. For certain types of medicines, for example anticancer drugs, special disposal methods are indicated. The general guidance provided below is for disposal of all medicines in a safe manner and applies to unused household medicines as well as those from long-term healthcare facilities:

1. Most importantly, do not dispose unused medicines down the drain. That is, medicines should be neither flushed down the toilet nor poured down the drain.

2. Follow local disposal practices including community pharmaceutical take back programs where available. Disposal practices vary by region. In most European nations, unused medicines can be returned to the pharmacy for safe collection and disposal by incineration. In the US and many other nations, local take-back programs may exist through pharmacies or government or community waste treatment programs. Contact your pharmacy or local waste disposal agencies for more information if needed.
   Collection of unused medicines for reuse is an acceptable alternative in some communities if authorized programs exist.

3. In the absence of local take back programs, dispose unused medicines in household trash taking precautions to avoid accidental misuse or possible diversion for drug abuse. Render unused medicine undesirable and unrecognizable (e.g. mix with household waste in non-descript packaging). Mark out or remove any labelling identifying personal prescription information.

Don't forget that a simple preventive measure to reduce waste, when possible, is to get only the quantity of medicine you need. This will minimize having to dispose of expired unused medicines later.

Sanofi-aventis www.sanofi-aventis.com
Sustainability Direction
Tel.: + 33 (0)1 53 77 40 00

sanofi aventis
Because health matters

As part of this effort, sanofi-aventis supports proper disposal of unused and expired medicines through consumer take-back programs in many nations and through returned goods programs from hospitals, clinics, and pharmacies.

These simple but effective steps will contribute to protecting our environment.

Further information about safe medicine disposal can be found at the local or state/regional websites; examples are given below :

In Europe:

- **France:**
  www.unpf.org/cyclamed/
- **UK:**
  www.pfc.org.uk/node/633#pharmacist
- **Germany** (example of a regional site)**:**
  www.umwelt.nrw.de/umwelt/abfall/entsorgungshinweise/arzneimittel/index.php
- **Sweden:**
  www.apoteket.se/rd/d/5837
- **Italy:**
  www.ministerosalute.it/medicinaliSostanze/paginaInternaMedicinaliSostanze.jsp?id=13&menu=med

In the US:

- www.smarxtdisposal.net
- www.epa.gov/ppcp/faq.html#how
- www.whitehousedrugpolicy.gov/drugfact/factsht/proper_disposal
- www.fda.gov/consumer/updates/drug_disposal062308.html

In Canada:

- www.hc-sc.gc.ca/iyh-vsv/med/disposal-defaire_e.html
- www.pharmacists.ca/content/consumer_patient/resource_centre/faqs/index.cfm

In Australia:

- tga.gov.au/meds/healthcare.htm#expired

Verbraucherinformation

Der Sachverständigenrat für Umweltfragen (SRU) hat sich in 2007 mit dem Thema Arzneimittel in der Umwelt befasst, Risiken bewertet und Handlungsmöglichkeiten aufgezeigt. Aktuelle Umfragen haben ergeben, dass einige Verbraucherinnen und Verbraucher ihre Altmedikamente umweltgefährdend über die Toilette entsorgen.

Dies zum Anlass genommen, informiert das vorliegende Faltblatt über die Entsorgung der Altmedikamente. Die richtige Entsorgung von Altmedikamenten ist ein wichtiger Beitrag, die Belastung von Gewässern und Böden durch Arzneimittelrückstände zu reduzieren.

Weitere Informationen, z. B. über die Entsorgung von krankenhausspezifischen Abfällen oder über den Umgang mit Zytostatika finden Sie unter

- **www.mufv.rlp.de/ifag-startseite**
  Arbeitskreis IFAG – Informations Forum Abfallwirtschaft im Gesundheitswesen in Rheinland-Pfalz: Abfall-ABC, Praxistipps
- **www.bgw-online.de**
  Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege: Broschüre „Abfallentsorgung“, Broschüre M 620 – Umgang mit Zytostatika usw.

Umweltdaten:

- **www.umweltatlas.rlp.de**
  Umweltatlas des Landes Rheinland-Pfalz zu verschiedenen Themen mit entsprechenden Karten.
- **www.geoportal-wasser.rlp.de**
  Kartenbasierte Daten zum Thema Wasser
- **www.umweltrat.de**
  Sachverständigenrat für Úmweltfragen

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Rheinland-Pfalz
Am Gautor 15 • 55131 Mainz
Tel.: (0 61 31) 2 70 12-0
www.lak-rlp.de

Landesärztekammer Rheinland-Pfalz
Deutschhausplatz 3 • 55116 Mainz
Tel.: (0 61 31) 2 88 22-0
www.laek-rlp.de

Landeszahnärztekammer
Rheinland-Pfalz
Langenbeckstraße 2 • 55131 Mainz
Tel.: (0 61 31) 9 61-36 60
www.lzk-rheinland-pfalz.de

Informations Forum Abfallwirtschaft
im Gesundheitswesen
www.mufv.rlp.de/ifag-startseite

RheinlandPfalz

Ministerium für Umwelt, Forsten und Verbraucherschutz

ALTMEDIKAMENTE ENTSORGEN

Verbraucherinformation

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Daniela Arnold, Dipl.-Ing. (FH), Ministerium für Umwelt, Forsten und Verbraucherschutz Rheinland-Pfalz

Abbildungen: ABDA – Bundesvereinigung Deutscher Apothekerverbände, Berlin

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Arzneimittel sicher aufbewahren

Arzneimittel müssen geeignet und sicher gelagert werden, d.h. evtl. kühl, lichtgeschützt, trocken. Sie gehören nicht in Kinderhände und sollten so aufbewahrt werden, dass Unbefugte keinen Zugriff haben.

Bewusst einkaufen statt unbenutzt entsorgen

Arzneimittel können nicht umgetauscht werden! Informieren Sie sich vor dem Kauf sorgfältig über Inhaltsstoffe und Nebenwirkungen (Beipackzettel) und beraten Sie sich mit Ihrem Arzt oder Apotheker.

Arzneimittel in der Umwelt

Viele Arzneimittel sind kaum oder nur schwer biologisch abbaubar. Wer Medikamente einnimmt, scheidet automatisch Arzneimittel oder deren Abbauprodukte in Spuren aus, die über die Toilette in das Abwasser gelangen. Dadurch können geringste Rückstände (z. B. Antibiotika) in Gewässer und in den Boden gelangen. Dies hat möglicherweise einen Einfluss auf die Resistenzbildung von Krankheitserregern beim Menschen.

Wohin mit alten Arzneimitteln?

Auf keinen Fall in die Toilette bzw. ins Abwasser geben!

Abgabe bei Apotheken, bei Schadstoff-Mobil oder Schadstoffsammelstelle

Verbraucher können ihre alten Arzneimittel bei Apotheken abgeben oder über die Schadstoffsammlung ihrer Kreis- oder Stadtverwaltung entsorgen. Dort ist nicht nur eine sichere Lagerung, sondern auch der Weg in die Verbrennung gewährleistet.

Entsorgung mit dem Restmüll?

Die meisten Haushalte sind an eine Müllverbrennung angeschlossen und können ihre Altmedikamente in die Restmülltonne geben. Auskunft erteilt Ihre Kreis- oder Stadtverwaltung und ggf. Ihre Apotheke.

Umweltdaten im Internet: siehe umseitig

Verpackung entfernen?

Leere Verpackungen von Arzneimitteln können verwertet werden, z. B. Kartonage-Verpackung zum Altpapier. Arzneimittelreste (Tabletten, Dragees usw.) sollten in der Verpackung (Blister, Fläschchen usw.) verbleiben und in dieser entsorgt werden (s. oben).

Arzneimittel aus der Krebsbehandlung: Zytostatika

Zytostatika sind therapeutische Substanzen aus der Krebsbehandlung (Chemotherapie). Wegen des Gefährdungspotenzials sind im Umgang und bei der Entsorgung einige Besonderheiten zu beachten (s. auch weitere Infos).

Zytostatika gehören nicht in den Restmüll und sind entweder bei Apotheken bzw. Krankenhäusern oder bei der mobilen Schadstoffsammlung abzugeben.

- **Gebrauchte Verbände, Pflaster und Mullbinden**
  gehören ebenfalls in den Restabfall. Von diesen gehen in der Regel keine Gefahren aus. Nur bei infektiösem Material müssen diese gemäß den **ärztlichen Anweisungen** und unter Einhaltung von Hygienevorschriften getrennt entsorgt werden.
  Pflaster, mit denen ein Arzneimittel direkt über die Haut aufgenommen werden soll (z.B. Hormonpflaster), sind wie Tabletten zu entsorgen, da diese Pflaster auch nach der Anwendung noch größere Mengen Wirkstoff enthalten.

Quelle: Andreas Naulin, Umweltbundesamt

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Nachhaltige Arzneimittelentsorgung –

Zum vorsorgenden Schutz unserer Wasserressourcen

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Gründe für eine besondere Sorgfalt bei der Arzneimittelentsorgung

Aktuelle Untersuchungen zeigen, dass einige Arzneimittelwirkstoffe in Kläranlagen nicht vollständig abgebaut werden. Somit können sie mit dem Abwasser in Bäche und Flüsse gelangen und unsere Umwelt belasten. Die Gewässer stellen jedoch auch eine wesentliche Ressource für die Trinkwassergewinnung dar.

Quelle: Andreas Naulin, Umweltbundesamt

Häufig werden nicht mehr benötigte Arzneimittel über die Ausgüsse und Toiletten entsorgt, obwohl die Entsorgung über das Abwassersystem verboten ist. Dies ist ein Grund dafür, dass Arzneimittel in Gewässern vorkommen.

Eine sorgfältige Arzneimittelentsorgung verhindert den Eintrag von Schadstoffen bereits an der Quelle: eine wesentliche Voraussetzung für einen vorsorgenden Gewässerschutz. Dies trägt dazu bei, dass eine für Unternehmen und Bürger teure Wasseraufbereitung und Abwasserbehandlung vermieden werden kann.

Richtige Entsorgung von Arzneimitteln

Arzneimittel sollten auf keinen Fall über die Toilette oder das Waschbecken entsorgt werden. Je nach Regelung der Kommune kann man Arzneimittel über gesonderte Schadstoffsammelstellen oder über die Rücknahme in Apotheken **kostenlos** entsorgen. Auch eine Entsorgung über die Sammelbehälter für Restabfälle (die sogenannte „graue Restmülltonne“) ist möglich, wenn damit sichergestellt ist, dass sie direkt ohne Zwischenbehandlung einer fachgerechten und sicheren Entsorgung durch thermische Behandlung in einer Müllverbrennungsanlage zugeführt werden.

Alte oder nicht verbrauchte Arzneimittel können sicher mit dem **Restabfall** entsorgt werden, wenn dieser verbrannt wird. Bei der Sammlung ist auszuschließen, dass die Arzneimittel entdeckt werden und z.B. durch Kinder oder sonstige Unbefugte missbräuchlich benutzt werden. Auskünfte über die Art der Entsorgung des Restabfalls sowie die Standorte und Öffnungszeiten der Sammelstellen für gefährliche Abfälle erteilen die Beratungsstellen der Städte und Gemeinden.

Die meisten **Apotheken** nehmen alte oder nicht verbrauchte Arzneimittel entgegen, obwohl sie zur Rücknahme nicht gesetzlich verpflichtet sind. Etwa drei Viertel der Apotheken sind an ein kostenloses Sammelsystem angeschlossen, das die Arzneimittel einer thermischen Entsorgung zuführt.

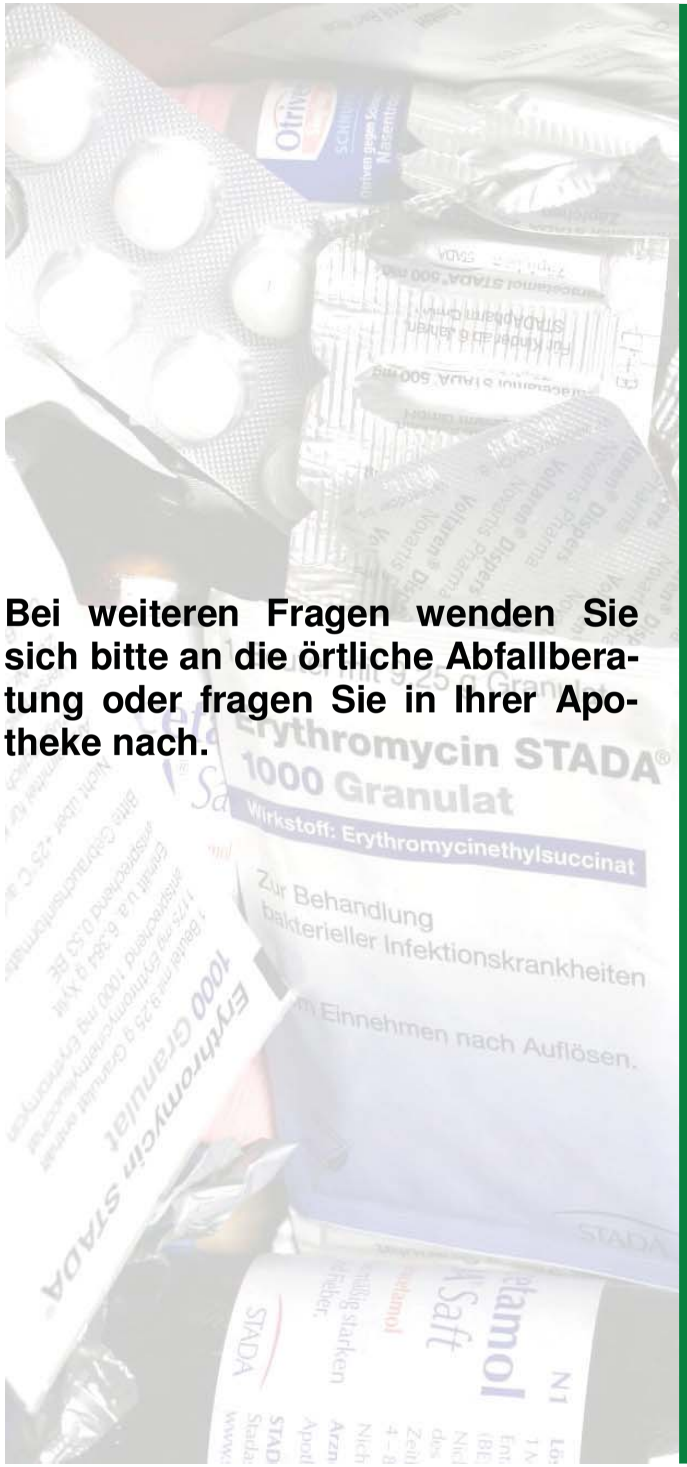
Tipps zur Entsorgung von Arzneimitteln

Verpackungen:

- **Umverpackungen** und Beipackzettel aus Papier, Pappe und Karton sind mit dem Altpapier zu entsorgen.
- **Leere Arzneimittelverpackungen aus Kunststoff** gehören in den Gelben Sack oder die Gelbe Tonne.
- **Leere Arzneimittelbehälter aus Glas** sind entsprechend ihrer Farbe der Altglassammlung zuzuführen.

Arznei- und Verbandmittel:

- **Tabletten und flüssige Arzneimittel** können in ihrer Produktverpackung über die kommunale Schadstoffsammelstelle, über die Apotheke oder über den Abfallsammelbehälter für Restabfälle (die graue Restmülltonne) entsorgt werden.
- **Einwegspritzen und Kanülen** müssen in einem stichfesten, verschließbaren Behältnis gesammelt werden und können verdeckt ebenfalls über den Abfallsammelbehälter für Restabfall (graue Restmülltonne) entsorgt werden. Solche gebrauchten Medikalprodukte werden aufgrund des Infektionsrisikos weder in Apotheken noch an kommunalen Sammelstellen (Recyclinghöfen) angenommen.



Bei weiteren Fragen wenden Sie sich bitte an die örtliche Abfallberatung oder fragen Sie in Ihrer Apotheke nach.

Abfallberatung der Stadt Gütersloh im Fachbereich Umweltschutz,
Eickhoffstr. 33 / Ecke Friedrich-Ebert-Straße
33330 Gütersloh

Tel.: 82 21 22

Internet: www.umwelt.guetersloh.de

Diese Informationsbroschüre wurde in Zusammenarbeit mit der Kreisvertrauensapothekerin des Kreises Gütersloh, der Stadt Bielefeld, der Stadt Gütersloh, des Kreises Lippe und des Kreises Paderborn erstellt.

Arzneimittel

Wichtige Tipps zur richtigen Entsorgung!

Stadt Gütersloh

Ideen für die Umwelt
Fachbereich Umweltschutz

Arzneimittel

richtig entsorgen!

Nicht mehr benötigte Arzneimittel müssen mit großer Sorgfalt entsorgt werden. Ein geeigneter Weg ist, solche Arzneien über eine Apotheke zurückzuführen. Hier werden diese in der Regel kostenlos angenommen und fachgerecht entsorgt.

Manche Kommunen bieten zur Entsorgung von Arzneimitteln separate Sammlungen an. Nähere Einzelheiten dazu erfahren Sie bei der Abfallberatung bzw. der dafür zuständigen Beratungsstelle Ihrer Stadt oder Gemeinde.

Warum müssen Arzneimittel mit besonderer Sorgfalt entsorgt werden?

Aktuelle Untersuchungen belegen, dass manche Wirkstoffe von Arzneimitteln über das Abwasser in Bäche und Flüsse gelangen und somit unsere Umwelt belasten.

Ein Grund dafür ist, dass einige Mitbürger nicht mehr benötigte Arzneien über die Ausgüsse und Toiletten entsorgen, obwohl die örtlichen Abwassersatzungen die Entsorgung von Abfällen über das Abwassersystem untersagen.

Auch wenn das allgemeine Abfallrecht die Entsorgung von Arzneien über den Restmüll zulässt, empfehlen die meisten Städte und Gemeinden, Arzneien in den Apotheken abzugeben. So wird der Zugriff und ein möglicher Missbrauch durch Kinder und sonstige Unbefugte unterbunden.

Helfen Sie mit und geben Sie Ihre Arzneimittel in den Apotheken oder bei kommunalen Sammlungen ab. Von dort aus werden diese richtig entsorgt.

Tipps zur Entsorgung von Arzneimitteln:

- **Tabletten** in Blisterverpackungen oder Dosen sowie flüssige Arzneimittel in Flaschen und Salbentuben sammeln Sie am besten in einem Beutel und geben ihn bei Ihrem nächsten Apothekenbesuch dort ab. Einige Städte oder Gemeinden nehmen an bestimmten Sammelstellen oder bei separaten Sammlungen Ihre Arzneimittel entgegen, oftmals sogar kostenlos.
- **Leere Arzneimittelverpackungen** aus Kunststoff oder Verbundmaterialien (Blisterverpackungen, Dosen, Salbentuben oder Plastikflaschen) gehören in den Gelben Sack.
- **Leere Arzneimittelbehälter** aus Glas sind entsprechend ihrer Farbe der Altglassammlung zuzuführen.
- **Einwegspritzen und Kanülen** müssen in einem stichfesten, verschließbaren Behältnis gesammelt werden und können verdeckt über die Restmülltonne entsorgt werden. Solche gebrauchten Medikalprodukte werden aus hygienischen Gründen weder in den Apotheken noch an den meisten Sammelstellen angenommen!!!

Beispiele für stichfeste Behältnisse

Weitere Informationen erhalten Sie in der Apotheke oder bei der Abfallberatung

- **Gebrauchte Verbände, Pflaster und Mullbinden** gehören ebenfalls in den Hausmüll. Von diesen gehen in der Regel keine Gefahren aus. Nur bei infektiösem Material müssen diese gemäß der Anweisung Ihres Arztes und unter Einhaltung bestimmter Hygienevorschriften entsorgt werden.
- **Umverpackungen, wie z.B. Kartons und auch die Beipackzettel** von Arzneien, vor der Abgabe in der Apotheke oder Sammelstelle entfernen und diese mit dem Altpapier entsorgen

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Apothekergenossenschaft, Essen

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NOWEDA eG

Die richtige Entsorgung
alter Arzneimittel ist Ihr Beitrag
zum Umweltschutz!

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Ein Platz für alte Pillen!

Umweltamt

STADT
ESSEN

Wohin mit alten Arzneimitteln?

Auf keinen Fall in die Toilette bzw. ins Abwasser geben!

Jede Tablette und jeder Tropfen Arzneisaft, der nicht in das Abwasser und damit in den Wasserkreislauf gelangt, entlastet unsere Umwelt erheblich, denn Medikamente sind oft nur langsam oder gar nicht biologisch abbaubar.

Kein Platz für alte Pillen!

Alte, nicht mehr benötigte Arzneimittel gehören in den Hausmüll!

Der umweltverträglichste und einfachste Weg, nicht mehr benötigte Medikamente zu entsorgen, ist die **graue Tonne**.
In den Müllverbrennungsanlagen werden arzneiliche Wirkstoffe so zerstört, dass kein Eintrag in die Umwelt mehr erfolgen kann. Darüber hinaus können Altmedikamente samt Verpackung in vielen Apotheken in die rote Tonne gegeben werden.
So leisten Sie einen wichtigen Beitrag für den Umweltschutz.

Arzneimittel gehören nicht in Kinderhände!

Kinder können Tabletten für bunte Bonbons halten. Auch deshalb ist es ratsam, Arzneimittel mit dem anderen Hausmüll zu vermischen.
Auch durch Einwickeln in Zeitungspapier können Arzneimittel „versteckt" werden. Spritzen oder Kanülen sollten dagegen entweder in stichfesten Gefäßen gesammelt und über den Hausmüll entsorgt oder in der Apotheke abgegeben werden.

Wer ganz sicher gehen möchte, sollte die „getarnten" Altmedikamente erst kurz vor dem Abfuhrtermin in die graue Tonne legen. In der roten Tonne in den Apotheken sind Arzneimittel am sichersten gegen Missbrauch geschützt.

Verpackungen entfernen?

Arzneimittelreste (Tabletten, Dragees usw.) sollten in den Kunststoffverpackungen (Blister) oder Fläschchen verbleiben und in diesen entsorgt werden. Leere Kartons gehören in die Papiertonnen, leere Kunststoffverpackungen in die gelbe Tonne.

Bewusst einkaufen statt unbenutzt entsorgen!

- Arzneimittel können nicht umgetauscht werden!
- Lassen Sie sich vor dem Kauf von Ihrem Arzt und Apotheker beraten.
- Viele Essener Apotheken bieten eine kostenfreie Beratung und Kontrolle Ihrer Hausapotheke an.

Hier liegen sie richtig!

Entsorgung von Altmedikamenten

Der Sachverständigenrat für Umweltfragen (wissenschaftliches Beratungsgremium der Bundesregierung) hat sich in 2007 mit dem Thema Arzneimittel in der Umwelt befasst, Risiken bewertet und Handlungsmöglichkeiten aufgezeigt. Aktuelle Umfragen haben ergeben, dass einige Verbraucherinnen und Verbraucher ihre Altmedikamente umweltgefährdend über die Toilette entsorgen. Dies zum Anlass genommen informiert diese Seite über die Entsorgung der Altmedikamente.

Die richtige Entsorgung der Altmedikamente ist ein wichtiger Beitrag, die Belastung von Gewässern und Böden durch Arzneimittelrückstände zu reduzieren.

Arzneimittel sicher aufbewahren

Arzneimittel müssen geeignet und sicher gelagert werden, d.h. evtl. kühl, lichtgeschützt, trocken. Sie gehören nicht in Kinderhände und sollten so aufbewahrt werden, dass Unbefugte keinen Zugriff haben.

Bewusst einkaufen statt unbenutzt entsorgen

Arzneimittel können nicht umgetauscht werden! Informieren Sie sich vor dem Kauf sorgfältig über Inhaltsstoffe und Nebenwirkungen (Beipackzettel) und beraten Sie sich mit Ihrem Arzt oder Apotheker.

Arzneimittel in der Umwelt

Viele Arzneimittel sind kaum oder nur schwer biologisch abbaubar. Wer Medikamente einnimmt, scheidet automatisch Arzneimittel oder deren Abbauprodukte in Spuren aus, die über die Toilette in das Abwasser gelangen. Dadurch können geringste Rückstände (z. B. Antibiotika) in Gewässer oder in den Boden gelangen. Dies hat möglicherweise einen Einfluss auf die Resistenzbildung von Krankheitserregern beim Menschen.

Wohin mit den alten Arzneimitteln?

- **Abgabe bei Apotheken und beim Umweltmobil**

Verbraucher können ihre alten Arzneimittel bei Apotheken oder beim Umweltmobil (Termine und Informationen s. S. 4-6) entsorgen. Dort ist nicht nur eine sichere Lagerung, sondern auch der Weg in die Verbrennung gewährleistet.

Nicht in die Restmülltonne, Toilette oder ins Abwasser geben!

Verpackung entfernen?

Leere Verpackungen von Medikamenten können verwertet werden, z.B. Kartonage-Verpackung zum Altpapier (blaues Fach der Wertstofftonne !). Arzneimittelreste (Tabletten, Dragees usw.) sollten in der Verpackung (Blister, Fläschchen usw.) verbleiben und in dieser entsorgt werden (s. oben).

Diese Abfälle nicht abgeben:

Gebrauchte Spritzen (z. B. von Diabetikern), Dialysebestecke (z. B. von der Heimdialyse), Blutkonserven oder sonstige mit Blut, Sekreten oder Exkreten kontaminierte Abfälle. Fragen zur Entsorgung von Abfällen aus der häuslichen Pflege, der Heimtherapie sowie zur Entsorgung von Abfällen aus medizinischen Einrichtungen beantwortet die Kreisverwaltung Cochem-Zell, Abteilung Abfallwirtschaft, Telefon: 02671/61-165.

Quelle: Ministerium für Umwelt, Forsten und Verbraucherschutz: Altmedikamente entsorgen, Verbraucherinformation

Weitere Informationen z. B. über die Entsorgung von Abfällen aus medizinischen Einrichtungen:

www.mufv.rlp.de/ifag-startseite Arbeitskreis IFAG – Informations Forum Abfallwirtschaft im Gesundheitswesen in Rheinland-Pfalz: Abfall-ABC, Praxistipps usw.
www.bgw-online.de Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege: Broschüre Abfallentsorgung, Broschüre M 620 – Umgang mit Zytostatika usw.
Umweltdaten:
www.umweltatlas.rlp.de Umweltatlas des Landes Rheinland-Pfalz zu verschiedenen Themen mit entsprechenden Karten
www.geoportal-wasser.rlp.de Kartenbasierte Daten zum Thema Wasser
www.umweltrat.de Sachverständigenrat für Umweltfragen

Landratsamt
Biberach

Das Umwelt- und Abfallwirtschaftsamt informiert:

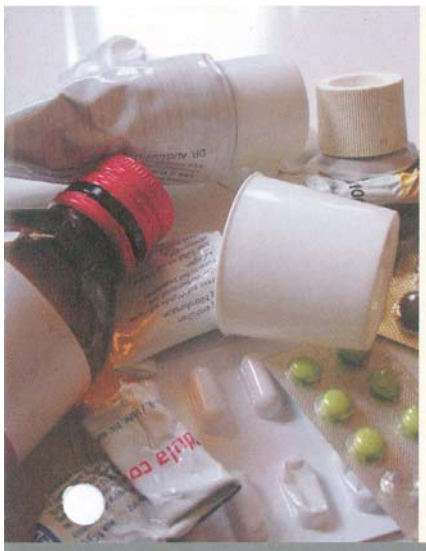
Alte Arzneimittel gehören in die Mülltonne

Oftmals landen alte Arzneimittel einfach in der Toilette. In der Folge wurden in den letzten Jahren immer häufiger Arzneimittelwirkstoffe in Flüssen nachgewiesen. Das Umwelt- und Abfallwirtschaftsamt im Landratsamt weist deshalb darauf hin, dass alte Arzneimittel oder nicht mehr benötigte Medikamente über die Hausmülltonne schadlos entsorgt werden können. Es ist lediglich dafür Sorge zu tragen, dass Kinder die bunten Pillen und Fläschchen nicht aus dem Mülleimer fischen.

Auch werden Altmedikamente bei der Problemstoffsammlung des Landkreises angenommen. Eine generelle Rücknahmepflicht der Apotheken besteht nicht.

Keinesfalls sollten Altmedikamente über die Toilette entsorgt werden. Die „Entsorgung“ über das häusliche Abwasser belastet unnötig Kläranlagen und Gewässer.

Bei Fragen: Umwelt- und Abfallwirtschaftsamt, Tel 07351/52-370.



Alte Arzneimittel richtig entsorgen

Baden-Württemberg
UMWELTMINISTERIUM

Alte und nicht mehr benötigte Arzneimittel gehören in den Hausmüll!

Die „graue Tonne" ist nicht nur der einfachste und bequemste Weg, nicht mehr benötigte Medikamente zu entsorgen, sondern auch der umweltverträglichste. Denn seit der Hausmüll fast ausschließlich den Müllverbrennungsanlagen zugeführt wird, werden die arzneilichen Wirkstoffe so zerstört, dass kein Eintrag in die Umwelt mehr erfolgen kann.

Leere Verpackungen „ganz normal" entsorgen!

Recyclingsymbole wie zum Beispiel der „Grüne Punkt", die sich auf Verpackungen befinden, beziehen sich nur auf die Verpackung und nicht auf den Inhalt. Solche Papierverpackungen gehören in Papiertonnen oder -container; Kunststoffverpackungen in die gelben Tonnen oder Säcke. So ist eine sinnvolle Verwertung der Verpackungen sichergestellt.

Arzneimittel gehören nicht in Kinderhände!

Kinder könnten die Tabletten für bunte Bonbons halten. Deshalb ist es ratsam, die Arzneimittel mit dem anderen Hausmüll zu vermischen und nicht aus den Blisterstreifen zu drücken.
Auch durch Einschlagen zum Beispiel in Zeitungspapier können Arzneimittel „getarnt" werden. Spritzen und Kanülen sollten dagegen entweder in stichfesten Gefäßen gesammelt und über den Hausmüll entsorgt oder in der Apotheke abgegeben werden.

Alte Arzneimittel nicht in die Toilette werfen!

Dass arzneiliche Wirkstoffe indirekt über menschliche Ausscheidungen in das Abwasser gelangen, ist nicht zu vermeiden. Doch jede Tablette und jeder Tropfen Arzneisaft, der nicht in das Abwasser und damit in den Wasserkreislauf gelangt, entlastet unsere Umwelt erheblich, denn Medikamente sind oft nur langsam oder gar nicht biologisch abbaubar und können sich in den Naturkreisläufen anreichern.

Abgelaufene oder nicht mehr benötigte Arzneimittel gehören in die graue Tonne. Darüber hinaus können sie samt Verpackung in vielen Apotheken abgegeben werden. So leisten Sie einen wichtigen Beitrag für den Umweltschutz.

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Für die Verbraucher sind einfache, einprägsame Verhaltensregeln wichtig:

Glas gehört in den Altglascontainer!

Papier gehört in die Altpapiertonne!

Altmedikamente gehören in die Apotheke!

Impressum

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Frechen

Sichere Entsorgungswege für Altmedikamente

Zur Notwendigkeit sicherer Entsorgungswege für Altmedikamente

• Die unsachgemäße Entsorgung von Altmedikamenten trägt erheblich zur **Belastung von Gewässern und Böden** durch Medikamentenrückstände bei.

• Für zwei Drittel der Verbraucher ist die Entsorgung von Arzneien über Apotheken grundsätzlich von Bedeutung – aber nur 29 Prozent der Bevölkerung entsorgen ihre alten Medikamente **immer** über Apotheken. 43 Prozent der Bevölkerung geben zu, nicht immer beim Einwurf auf **Trennung von Verpackung und Inhalt** zu achten.

• Gerade die weit verbreiteten **Fehleinwürfe von Arzneimittelverpackung plus alter Restmedikamente in den „Gelben Sack"** bzw. die „Gelbe Tonne" bedeuten ein besonderes Gefährdungspotential durch Medikamentenrückstände.

• **Die Entsorgung von Altmedikamenten in bestehenden Rücknahmesystemen muss gestärkt und ausgebaut werden,** um den missbräuchlichen Zugriff auf Altmedikamente für Drogenabhängige zu verhindern und um Kinder zu schützen.

• **Die Europäische Union fordert die Einrichtung geeigneter Sammelsysteme für nicht verwendete oder abgelaufene Arzneimittel.** Diese Forderung wird in Deutschland derzeit durch die bestehenden freiwilligen Rücknahmesysteme bereits erfüllt.

Ziel:
Möglichst hohe Anteile von Altmedikamenten vom Abwasser und von Grauer und Gelber Tonne fernhalten!

I. Gefahr für Umwelt und Mensch

Die sichere und kontrollierte Entsorgung von pharmazeutischen Produkten gehört zu den wichtigen Aufgaben des Gesundheitswesens. Altmedikamente bergen **schwerwiegende und langfristige Gefahren** für die Belastung von Böden und Gewässern.

1) Mengen

Alleine in Deutschland sind rund 3.000 verschiedene Arzneimittelwirkstoffe in ca. 50.000 Präparaten auf dem Markt, von denen einzelne in Mengen bis zu mehreren hundert Tonnen pro Jahr verabreicht werden. Nach Expertenschätzungen beläuft sich die Menge der zu entsorgenden Medikamente jährlich auf 4.000 bis 7.000 Tonnen, in einigen Quellen ist sogar von deutlich höheren Mengen die Rede. Verlässliche Angaben zu den Verbrauchsmengen und Entsorgungsmengen sind nicht zu ermitteln, da eine zentrale Erfassung fehlt. Gemäß einer Untersuchung von Lebensmittelchemikern der Technischen Universität Berlin werden etwa **80 Prozent der Wirkstoffe, die im Wasser zu finden sind, von Privathaushalten** eingebracht.

Zielerreichung:
Mit der Rücknahme von Altmedikamenten in Apotheken besteht in der Bundesrepublik ein bewährtes System, den Umgang mit problematischen Produkten nachhaltig und verantwortlich zu gestalten. Pharmaindustrie, Apotheken und Verbraucher wirken zusammen, um den Problemabfall Altmedikamente ökologisch und sozialverantwortlich zu sammeln und einer sicheren Entsorgung zuzuführen.

2) Wasser

Seit etwa zehn Jahren warnen Forscher insbesondere vor den Gefährdungen, die durch einen Medikamenten-Cocktail im Trinkwasser ausgehen, der kaum abbaubar ist. Man konnte feststellen, dass Oberflächengewässer, Grund- und Trinkwasser vor allem mit Blutfettsenkern (Clofibrinsäure), Schmerzmitteln und Antirheumatika (Ibuprofen, Diclofenac) angereichert sind. Spitzenwerte von über 1 µg/l sind bei Gewässeruntersuchungen keine Seltenheit. Neben der Belastung der Trink- und Grundwässer durch die Ausscheidungen des Menschen über die Kanalisation geht man davon aus, dass die **unsachgemäße Entsorgung von Arzneimitteln,** insbesondere über die Toilette und den Hausmüll, ebenso **wesentlich für die Belastung von Gewässern** ist. Auch sind Kläranlagen bislang nicht dafür ausgerüstet, biologisch schwer abbaubare Substanzen sowie Spurenstoffe im Nano- oder Mikrogrammbereich je Liter zu entfernen.

Das Untersuchungsprogramm des Bund-Länder-Ausschusses für Chemikaliensicherheit (BLAC) kam zu dem Ergebnis, dass die Bedeutung der **Frachten von Arzneistoffen in Flüssen tendenziell größer ist als die von Pflanzenschutzmitteln.** Die ökologische Relevanz dieser Stoffe sei allerdings noch unklar. Gefährdungen schließt jedoch kein Sachverständiger aus.

Kopfschmerzen bereitet dies inzwischen den Wasserkontrolleuren, denn die Arzneistoffe – pharmakologisch aktive Substanzen – belasten die Gewässer. Analytiker des ESWE-Instituts für Wasserforschung und -technologie spürten bis heute im Grundwasser mehr als 40 verschiedene Substanzen auf.

3a) Gefahren für die Gesundheit durch belastetes Trinkwasser

Für den Menschen besteht dadurch ein erhebliches Gesundheitsrisiko. Eine Studie der Bochumer Ruhr Universität stellt sogar einen Zusammenhang der seit Jahren sinkenden Spermienanzahl bei Männern und der steigenden Rate der Hodenkrebs-Erkrankungen bzw. Genitalfehlbildungen durch Östrogene im Trinkwasser und in Lebensmitteln dar. Eine besondere Gefährdung besteht durch den Eintrag von Antibiotika ins Trinkwasser. Durch menschliche Ausscheidungen oder die nicht sachgerechte Entsorgung über die Toilette oder Spüle gelangen Antibiotikareste in den Wasserkreislauf. Dies führt unter anderem dazu, dass **Bakterien Resistenzen gegen Antibiotika** entwickeln. Der Freiburger Umweltmediziner Prof. Dr. Franz Daschner warnt deshalb:

„Die Waffe Antibiotika wird langsam stumpf. Die Bakterien waren nicht tatenlos, sondern haben in den vergangenen Jahrzehnten, vor allem aber in den letzten Jahren immer häufiger und immer schneller Resistenzen auch gegen die neuesten Antibiotika entwickelt. Mittlerweile sterben mehr Menschen weltweit an Infektionen durch antibiotikaresistente Bakterien als an AIDS, mehrere tausend Menschen täglich."



3b) Gefahren für die Gesundheit durch Missbrauch

Die sorglose Haltung, Medikamente grundsätzlich mit dem Hausmüll oder über die Gelbe Tonne zu entsorgen, birgt außerdem schwerwiegende Gefahren. So fordern die Ersatzkassenverbände in Hamburg, dass

„nicht mehr benötigte Arzneimittel nicht in den Hausmüll wandern, sondern direkt bei der Stadtreinigung oder in der Apotheke abgegeben werden, damit Unbefugte, ***wie etwa Kinder,*** *keinen Zugriff darauf haben und sie* ***zu sich nehmen, etwa in dem Glauben, es seien Bonbons.“***

Außerdem wird in der vergangenen Zeit immer häufiger beobachtet, dass Drogenabhängige den Müll nach Altmedikamenten durchsuchen, um sich Drogen-Cocktails zu mischen. In diese – in einigen Fällen sogar tödlichen Cocktails – werden von Drogenabhängigen die verschiedensten Mittel gemischt. Meist sind es Cocktails aus illegalen Suchtmitteln, Medikamenten und Alkohol.

Des Weiteren ist zu beachten, dass insbesondere in Miethäusern mit mehreren **Parteien meist keine saubere Trennung der Müllfraktionen** geschieht. Vielfach ist es so, dass im „Gelben Sack“ oder der Gelben Tonne fast identische Müllkomponenten wie in der Grauen Tonne vorgefunden werden.

II. Verbraucherverhalten

Das Frankfurter **Institut für Sozial Ökonomische Forschung** (ISOE) ging der Frage nach, wohin die Bundesbürger ihre Medikamente entsorgen. In einer 2006 durchgeführten repräsentativen Umfrage ermittelte das Institut folgendes Ergebnis:

„1977 Personen über 18 Jahre wurden in ihrem Entsorgungsverhalten von nicht verbrauchten Medikamenten befragt. Die Umfrage zeigte, dass in über 90 Prozent der befragten Haushalte Medikamente vorhanden sind. Etwa 50 Prozent der Haushalte bevorraten 6 bis 20 Medikamente in ihrer Hausapotheke. 75 Prozent der Befragten räumen einmal im Jahr oder häufiger ihre Hausapotheke auf oder entsorgen nicht mehr gebrauchte Medikamente sofort. Immerhin 16 Prozent der Befragten entsorgen nicht verbrauchte Tabletten über die Toilette, davon 3 Prozent immer oder häufig, der Rest manchmal oder selten. Reste von flüssigen Arzneimitteln werden sogar von 43 Prozent der Befragten gelegentlich und von 20 Prozent immer oder häufig über Spüle oder Toilette entsorgt. Dabei spielt der Recyclinggedanke eine Rolle – Glasbehälter werden ausgespült und ins Altglas abgegeben. Für etwa zwei Drittel der Befragten hat die Empfehlung, nicht verbrauchte ***Medikamente an die Apotheke zurückzugeben,*** *zwar Bedeutung, aber nur* ***29 Prozent entsorgen ihre Medikamente über diesen Weg.*** *16 Prozent werfen immer oder häufig Medikamente samt Verpackung in den normalen Restmüll, 27 Prozent gelegentlich oder selten.“*

Die Europäische Union (EU) verpflichtet im **Gemeinschaftskodex für Humanarzneimittel** (RL 2001/83/EG in der Fassung der RL 2004/27/EG, „Kodex") die Mitgliedstaaten zur Sicherstellung geeigneter Sammelsysteme für nicht verwendete oder abgelaufene Arzneimittel. Eine formale Umsetzung in deutsches Recht ist bisher nicht erfolgt, da die **Forderungen der EU-Richtlinie durch die bestehenden freiwilligen Rücknahmesysteme für Altmedikamente erfüllt** werden. Diese Rücknahmesysteme erfassen neben Altmedikamenten auch sortenrein und in getrennten Fraktionen restentleerte Medikamentenverpackungen in Apotheken und vergleichbaren Rückgabe- bzw. Anfallstellen.

IV. Lösungen

Der **Zugriff auf Altmedikamente** kann durch die Entsorgung in zugriffssicheren Rücknahmesystemen verhindert werden. Durch Einbindung von Apotheken in diese speziellen Rücknahmesysteme ist sichergestellt, dass die in der Apotheke zurückgegebenen Medikamente und deren Verpackungen nicht im Hausmüll oder der Gelben Tonne landen. Der **Verband forschender Arzneimittelhersteller e.V. fordert** daher, dass **Altmedikamente zurück in die Apotheke** gebracht werden – „Dies trägt zum Umweltschutz bei."

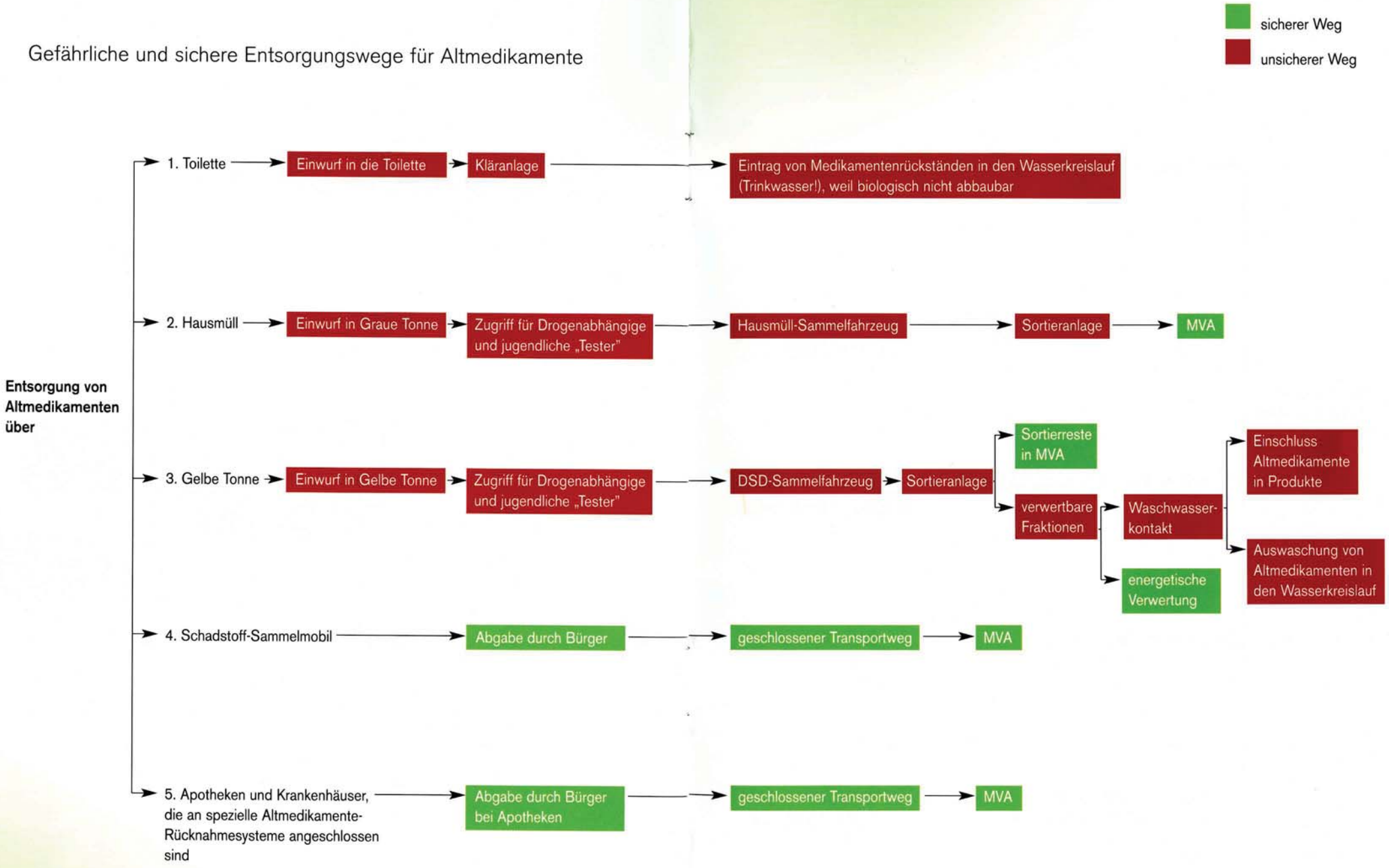


In Deutschland werden über 1.400 Tonnen der 4.000 bis 7.000 Tonnen Altmedikamente durch die speziellen und sicheren Rücknahmesysteme Vfw-REMEDICA und MEDIrecycling® entsorgt; der Rest wird in den Hausmüll geworfen oder die Toilette heruntergespült. Den sicheren Rücknahmesystemen sind derzeit über **17.000 Apotheken,** fast **80% aller Apotheken in Deutschland,** angeschlossen. Des Weiteren nehmen über 2.000 Krankenhäuser, Dialysestationen, Altenheime, Arzt- und Tierpraxen sowie sonstige medizinische Einrichtungen teil. Es wird geschätzt, dass mehr als 1 Milliarde der rund 1,6 Milliarden in den Verkehr gebrachten Verkaufsverpackungen bei diesem sicheren Rücknahmesystem gemeldet und entsorgt werden.

Apotheken und Verbraucher sind mit dem System **höchst zufrieden** und vertrauen darauf. In einer Umfrage von Vfw-REMEDICA gaben 98 Prozent der teilnehmenden Apotheken an, dass sie sehr zufrieden mit dem Rücknahmesystem seien. 97 Prozent der im Rahmen der Umfrage befragten Kunden gaben an, bewusst das Rücknahmesystem zu nutzen.

Aus Verantwortung für den Schutz der Bevölkerung und der Umwelt ist es daher zwingend notwendig, dass **sichere und fachgerechte Rücknahmesysteme erhalten und gestärkt werden!**

Gefährliche und sichere Entsorgungswege für Altmedikamente





Forderungen des Umweltschutzes

Um Einträge von Medikamenten in die Gewässer zu verringern, müssen mögliche Auswirkungen pharmakologischer Substanzen auf die Umwelt stärkere Berücksichtigung bei der Zulassung finden. Bei erheblichen Umweltauswirkungen muss eine Zulassung versagt werden, denn: Vorsogender Gewässerschutz ist schließlich auch Gesundheitsschutz.

Im Gegensatz zu Humanarzneimitteln besteht bei Tierarzneimitteln die Möglichkeit, die Zulassung zu versagen, sofern schädliche Auswirkungen auf die Umwelt festgestellt werden. Futtermittelzusatzstoffe wie Antibiotika und Wachstumsförderer unterliegen allerdings nicht der Arzneimittelgesetzgebung.

Für die bisher festgestellten Belastungen der Gewässer sind zum Großteil nur Arzneimittel verantwortlich, die vor Inkrafttreten der neuen Richtlinie zur Umweltprüfung von Medikamenten bereits im Verkehr waren. Für Medikamente älterer Zulassung (vor 2008) sind leider keine Umweltprüfungen vorgesehen. Deshalb unterstützen Sie die Forderung: Auch lange vermarktete Arzneimittel bedürfen einer nachträglichen, aussagekräftigen Stoffrisikobewertung hinsichtlich ihrer Umweltauswirkungen.

Unterstützen Sie unsere Arbeit für den Umwelt- und Naturschutz oder werden Sie Mitglied.

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BUND
FREUNDE DER ERDE

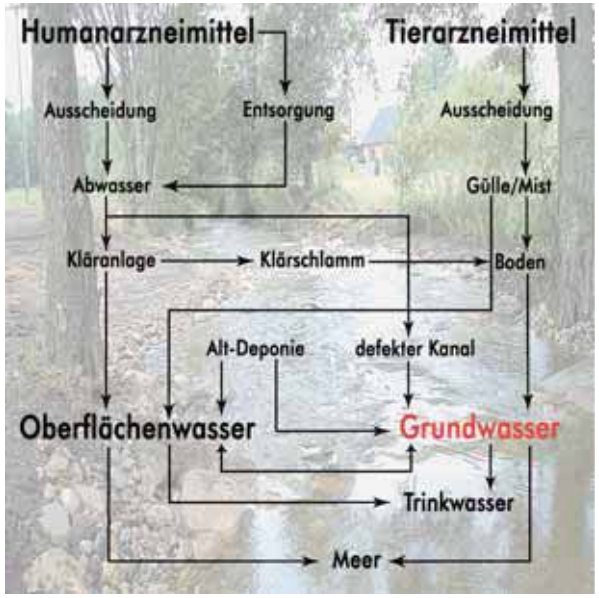
MEDIKAMENTE IN GEWÄSSERN

Therapie wider Willen

Zuviel Medikamentenrückstände belasten unsere Gewässer

Medikamente erleichtern im Bedarfsfall das Leben. Gut, daß es sie gibt. Allerdings werden sie zum Nachteil für Mensch, Umwelt und Gewässer in zu großen Mengen eingesetzt.

In Deutschland werden pro Jahr 38.000 Tonnen Humanpharmaka und 2.500 Tonnen Tierarzneimittel verbraucht. Von den etwa 3.000 Arzneimittel-Inhaltsstoffen die es gibt, können etwa 180 Stoffe analysiert werden. Davon wurden bisher mehr als 120 Wirkstoffe bzw. deren Abbauprodukte im Abwasser, Oberflächenwasser, Grundwasser oder Trinkwasser nachgewiesen. Ein Grund: Ein Großteil der Medikamente wird ungenutzt wieder ausgeschieden und gelangt mit dem Abwasser in die Kläranlage und von dort in den Wasserkreislauf.



Doch nicht allein auf diesem Wege findet ein Eintrag statt. Vor allem eine nicht fachgerechte Entsorgung alter oder nicht mehr benötigter Medikamente trägt erheblich zur Gewässerbelastung bei. Umfragen zufolge entsorgt ein beachtlicher Anteil der Bevölkerung übrig gebliebene Tabletten über die Toilette - insbesondere flüssige Medikamente. Dies belastet unsere Umwelt unnötig und muß vermieden werden.

Die Konzentrationen von Medikamentenwirkstoffen im Trinkwasser werden gemäß Umweltbundesamt (UBA) als nicht besorgniserregend eingeschätzt, liegen sie doch um mehrere Zehnerpotenzen unter den Gehalten einer therapeutischen Dosis. Dennoch besteht Handlungsbedarf: Zum einen sind die Auswirkungen geringer Konzentrationen von Medikamentenrückständen auf die menschliche Gesundheit und die Umwelt weitgehend unbekannt. Zum anderen wird die Bevölkerung in Deutschland immer älter und damit wird auch der Medikamentenverbrauch weiter ansteigen.

Zum umweltgerechten Umgang mit Medikamenten

- ☞ Medikamente keinesfalls über die Toilette oder das Waschbecken entsorgen.
- ☞ Abgelaufene und nicht mehr benötigte Medikamente sind an die Apotheke zurückzugeben.
- ☞ Etwa dreiviertel der deutschen Apotheken sind an ein Sammelsystem für Altarzneimittel angeschlossen. Stellen Sie sicher, dass Ihre Apotheke an dieses Sammelsystem angeschlossen ist. Wechseln Sie im Zweifelsfall die Apotheke.
- ☞ Führen Sie eine Liste über Ihren aktuellen Medikamentenbestand. Nehmen Sie diese Liste mit zu Ihrem Arztbesuch. So lassen sich unnötige Verschreibungen vermeiden und der Medikamentenverbrauch wird gesenkt.
- ☞ Reden Sie mit Ihrem Arzt über eine mögliche Umwelt-Problematik von Medikamenten. Wenn eine Behandlung mit Medikamenten nicht zu umgehen ist, fragen Sie nach einer Verschreibung umweltfreundlicher oder pflanzlicher Produkte. Fragen Sie auch nach an den tatsächlichen Bedarf angepaßten Packungsgrößen.

Entsorgung

Wohin mit Ihren alten Medikamenten?

Alte und nicht mehr benötigte Medikamente können Sie samt Verpackung kostenfrei in den Schadstoffsammelstellen der Berliner Stadtreinigungsbetriebe (BSR) abgeben. Dort werden sie in der Müllverbrennungsanlage beseitigt, so dass keine Arzneimittelrückstände in die Umwelt gelangen können.
Auch viele Apotheken nehmen Altarzneimittel inklusive Verpackung zur Entsorgung entgegen, obwohl sie hierzu gesetzlich nicht verpflichtet sind. Fragen Sie Ihre Apothekerin oder Ihren Apotheker!

Zuständige Schadstoffsammelstellen der BSR

Pankow: Behmstraße 74, 10439 Berlin
Spandau: Brunsbütteler Damm 47, 13581 Berlin
Neukölln: Gradestraße 77, 12347 Berlin
Steglitz-Zehlendorf: Hegauer Weg 17, 14163 Berlin
Marzahn-Hellersdorf: Nordring 5, 12681 Berlin
Treptow-Köpenick: Oberspreestraße 109, 12555 Berlin

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VERBRAUCHERSCHUTZ

Alte Arzneimittel richtig entsorgen

Verbraucherinformation

Grußwort

Katrin Lompscher

Liebe Berlinerinnen und Berliner,

Medikamente sollen uns helfen, gesund zu werden und zu bleiben – doch wenn sie in den Wasserkreislauf gelangen, belasten sie die Umwelt und können unsere Gesundheit gefährden.

Spuren von Arzneimittelrückständen finden sich heute in Böden und in Flüssen, Bächen und Seen; in einigen Fällen lassen sie sich selbst im Grundwasser – jedoch in extrem niedrigen Konzentrationen – nachweisen.
Im Trinkwasserbereich gibt es bisher keinen unmittelbaren Anlass zur Besorgnis: Trinkwasser ist das Lebensmittel Nr. 1 und wird von der Gewinnung bis zur Abgabe im Haushalt streng überwacht. Doch die allgemeinen Umweltrisiken sind nicht zu unterschätzen.

Deshalb bitte ich Sie: Entsorgen Sie alte Arzneimittel nicht in die Toilette oder den Ausguss, sondern bringen Sie sie zur BSR oder in Ihre Apotheke! Unsere Umwelt wird es Ihnen danken.

Katrin Lompscher
Senatorin für Gesundheit, Umwelt
und Verbraucherschutz

Fragen und Antworten

Warum gehören alte Arzneimittel nicht in den Ausguss oder die Toilette?

Dass arzneiliche Rückstände in das Abwasser gelangen, ist leider nicht völlig zu vermeiden. Denn Medikamente werden nur zu einem Teil im Körper abgebaut, der Rest wird ausgeschieden.

Ein Teil der Verunreinigung unserer Gewässer mit Arzneimittelrückständen ist allerdings darauf zurückzuführen, dass nicht mehr benötigte Tabletten oder flüssige Arzneien umweltgefährdend über den Ausguss oder die Toilette entsorgt werden.

Das Problem: Auch gut funktionierende Kläranlagen entfernen Arzneimittelrückstände nicht vollständig. So können Reste davon mit dem Ablauf aus dem Klärwerk in die Oberflächengewässer gelangen. Über kurz oder lang können sie sogar ins Grundwasser vordringen, aus dem unser Trinkwasser gewonnen wird.

Deshalb gilt: Jede Tablette und jeder Tropfen eines flüssigen Arzneimittels, die nicht in das Abwasser und damit in den Wasserkreislauf gelangen, entlasten unsere Umwelt und schützen unsere Gesundheit.

Warum gehören alte Arzneimittel nicht in den Hausmüll?

Bitte werfen Sie alte Medikamente nicht in den Hausmüll!

Gegen eine Entsorgung mit dem Hausmüll spricht, dass Kinder die bunten Pillen für Bonbons halten und sich daran vergiften können. Um Kinder zu schützen und Missbrauch durch Unbefugte zu verhindern, sollten Sie alte Arzneimittel in der Apotheke abgeben oder sie zu einer Schadstoffsammelstelle der BSR bringen.

Leere Medikamentenverpackungen können Sie hingegen je nach Material entweder zum Altpapier, in die gelbe Tonne oder zum Altglas geben. So ist eine sinnvolle Verwertung sichergestellt.

Haben Sie Fragen?
Sprechen Sie uns an.

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Arzneimittel – Wasser – Umwelt

› So schützen wir vorsorglich unser Trinkwasser

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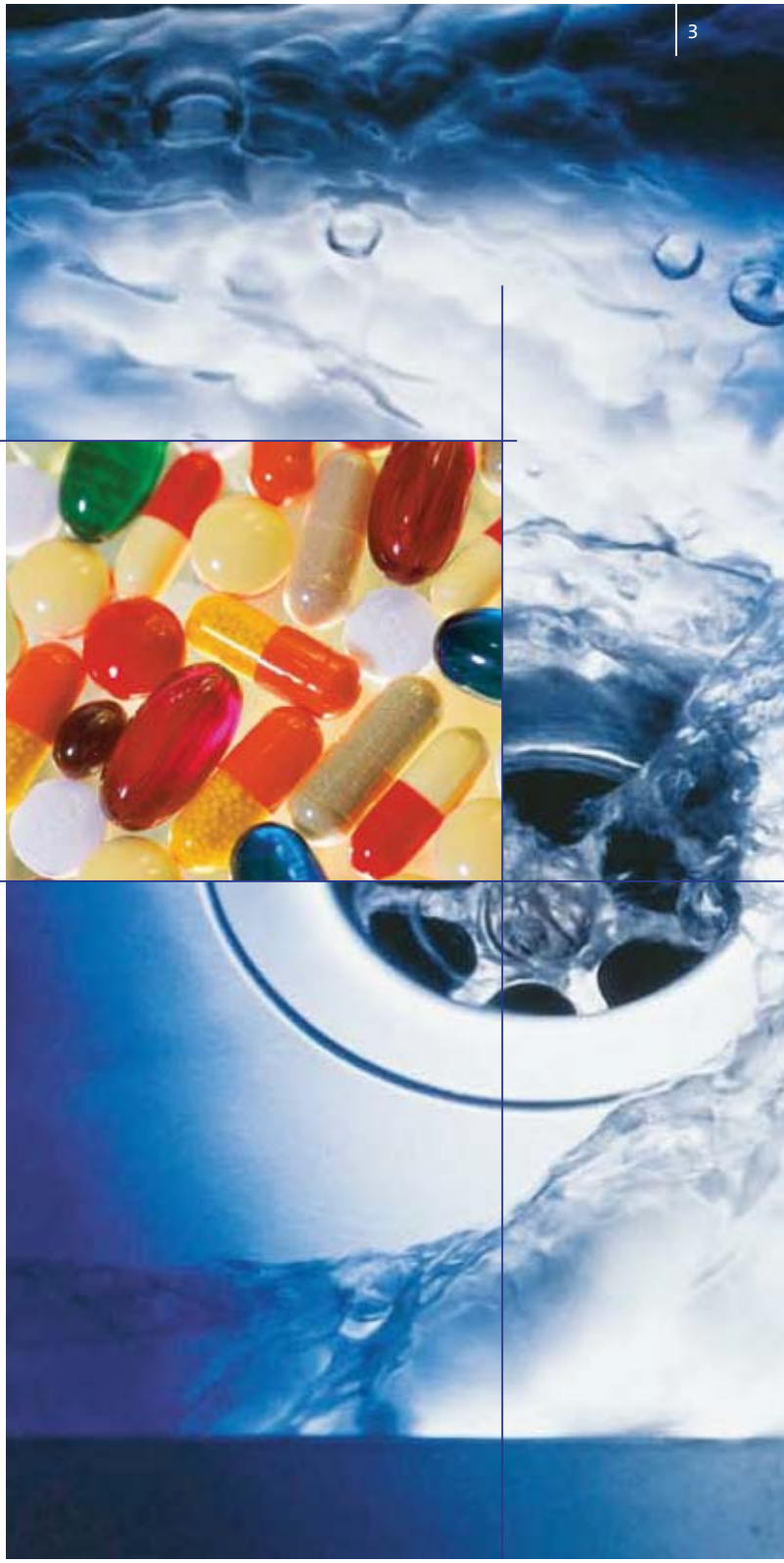
Arzneimittel auf ihrem Weg in die Umwelt

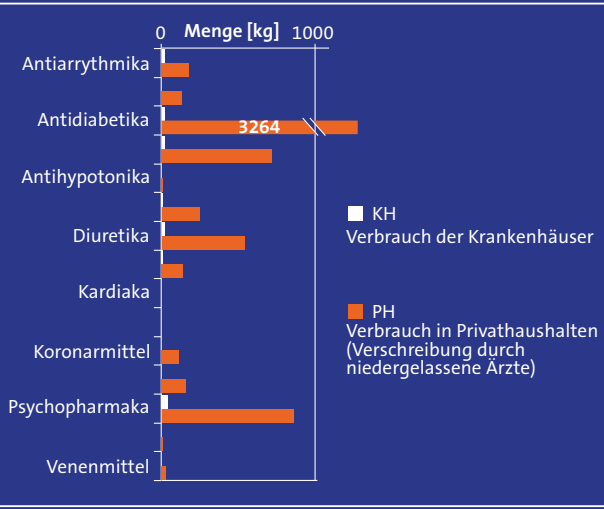
Arzneimittel nehmen wir ein, um gesund zu werden oder gesund zu bleiben. Sind wir wieder gesund, vergessen wir sie, bis wir sie wieder benötigen.

Arzneimittel verschwinden aber nicht einfach, nachdem sie ihre Wirkung getan haben. Vielmehr scheiden wir einen Großteil von ihnen unverändert wieder aus. Sie gelangen so ins Abwasser. Häufig sammeln sie sich im Laufe der Zeit auch in unserer Hausapotheke an, weil wir nicht alles so eingenommen haben, wie wir sollten oder weil die Packung zu groß war. Irgendwann entsorgen wir sie – trotz Verbot oft über die Toilette – und so gelangen auch Reste und verfallene Arzneimittel ins Abwasser.

Neben den Krankenhäusern als eine Hauptquelle für Arzneimittel in der aquatischen Umwelt sind es vor allem die Patienten – also wir alle, die ihre von den niedergelassenen Ärzten verschriebenen Medikamente wie z. B. Antibiotika, schmerz- und entzündungshemmende Mittel, Herzmittel, Psychopharmaka u. a. zu Hause einnehmen, die zum Eintrag von Arzneimitteln in kommunale Abwässer beitragen. Schätzungen gehen davon aus, dass bis zu einem Drittel der gesamten in Deutschland verkauften Arzneimittelmengen in den Hausmüll oder als Abfall ins Abwasser gelangen.



In Deutschland „verbraucht“, d. h. kauft bzw. bekommt jede Person 500 g an Arzneimittelwirkstoffen pro Jahr.



Arzneimittelverbrauch im Einzugsgebiet der Kläranlage Breisgauer Bucht im Jahr 2004 nach Quellen.

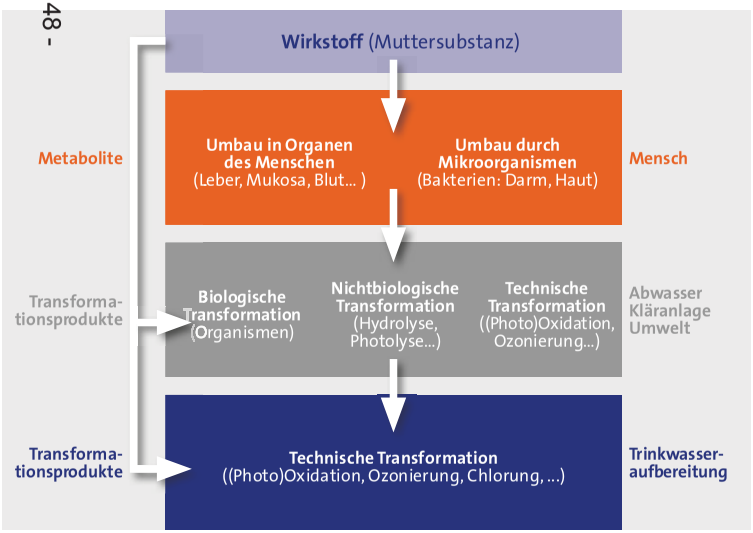
Die ausgeschiedenen Substanzen gelangen dann über das Abwasser in die Kläranlagen. Dort werden sie gar nicht oder nur unvollständig entfernt und erreichen mit dem ansonsten gereinigten Abwasser Flüsse und Seen. Mit modernen Methoden der Analytik sind sie im Abwasser, in Flüssen, Seen und zum Teil im Grundwasser in geringen Konzentrationen von Wirkstoffen nachweisbar. Gleiches gilt für Desinfektionsmittel, Kontrastmittel, die z. B. beim Röntgen eingenommen werden müssen und Bestandteilen von Körperpflegemitteln wie Duft- und Konservierungsstoffe.

Welche Wirkung haben Medikamente im Wasser?

Die in Seen, Flüssen und einigen Grundwässern gemessenen Konzentrationen dieser z. T. biologisch hoch aktiven Stoffe reichen für eine akute Wirkung beim Menschen bei weitem nicht aus. Allerdings ist ungeklärt, wie sich eine niedrige Dauerbelastung langfristig auswirken könnte. Auch wenn sie nicht wirksam sein sollten, sind diese und andere Spurenstoffe in Gewässern und insbesondere im Trinkwasser aus hygienischen Gründen und Arzneimittel insbesondere auch unter dem Gesichtspunkt der Vorsorge unerwünscht. Naturfremde Stoffe dürfen ungeachtet ihrer Wirksamkeit grundsätzlich nicht in die Gewässer gelangen. Schließlich möchten wir sie auch in Zukunft nicht im Trinkwasser haben. Ihr Vorhandensein in Seen, Flüssen und zum Teil in Grundwasser steht mittelfristig der Gewinnung von einwandfreiem Trinkwasser mit natürlichen Verfahren entgegen.

Hinzu kommt, dass die in der aquatischen Umwelt gemessenen Konzentrationen einzelner Wirkstoffe in einigen Fällen in Bereichen liegen, bei denen eine Wirkung auf Organismen wie Fische oder Algen wahrscheinlich erscheint (z. B. das Hormon in der Antibabypille oder ein Wirkstoff in Schmerzmitteln wie Diclofenac).

Auch die Wirkstoffe von Arzneimitteln werden durch den Stoffwechsel verändert und zu einem oder mehreren Metaboliten umgewandelt.



Wirkstoffe und Metabolite werden in der Kläranlage zum Teil abgebaut oder mit dem Klärschlamm entfernt. Manche können jedoch hartnäckige Transformationsprodukte bilden, die derzeit noch weniger erforscht sind als ihre Ausgangsstoffe. In der Trinkwasseraufbereitung werden manche Arzneimittelwirkstoffe selbst durch Verfahren wie Sorption an Aktivkohle oder Behandlung mit Ozon nicht aus dem Wasser entfernt.

Was können und sollen wir tun?

Da ein Verbot der Stoffe nicht in Frage kommt und die aufwändige Behandlung von Abwasser und Trinkwasser allenfalls die zweitbeste Lösung ist, geht es um die Verminderung und Vermeidung von Einträgen dieser Stoffe in die Umwelt. Daher sollten Arzneimittelreste, verfallene Arzneimittel und andere chemische Stoffe nicht über die Toilette entsorgt werden – was im Übrigen verboten ist. Nach geltendem Gesetz sind Arzneimittel – bis auf wenige Ausnahmen wie Zytostatika – kein Sondermüll und können daher grundsätzlich mit dem Hausmüll entsorgt werden. Sie werden dann mit diesem verbrannt und damit unschädlich gemacht. Weiter nehmen die meisten Apotheken alte oder nicht verbrauchte Arzneimittel entgegen, obwohl sie zur Rücknahme nicht gesetzlich verpflichtet sind.

Arzneimittel nicht zu Hause zu horten, ist ein Beitrag zum vorsorglichen Wasserschutz. Es empfiehlt sich, vor jedem Arzt- und Apothekenbesuch die Hausapotheke auf noch gültige Mittel zu überprüfen, damit unnötige Nachbeschaffungen vermieden werden. Das führt im Ergebnis zu einer gut sortierten Hausapotheke, die in jedem Haushalt selbstverständlich sein sollte.

Alle können einen Beitrag leisten – Patienten, Ärzte, aber auch die Arzneimittelhersteller selbst durch die Bereitstellung passenderer Packungsgrößen. Ein bewussterer Umgang mit Arzneimitteln sorgt dafür, dass unser Trinkwasser weiterhin frei von unerwünschten Stoffen bleibt. Die Vermeidung überflüssiger Arzneimittel spart Geld, entlastet die Umwelt und schont unser Trinkwasser.

Daphnia magna, Kleinkrebs
Daphnien leben in Seen und Teichen. Sie reagieren empfindlich auf Schadstoffe im Wasser und lassen über die Beeinträchtigung ihrer Bewegungsfähigkeit eine Aussage über Giftstoffe im Wasser zu. Der hierfür genormte Test wird Daphnientest genannt.

Bildquelle:
Public Library of Science

Informationen zur Entsorgung von Altmedikamenten

In jedem Haushalt sind sie zu finden, alte Medikamente, die nicht mehr gebraucht werden. Spätestens wenn die Hausapotheke einmal kritisch gesichtet wird, stellt sich die Frage nach der richtigen Entsorgung der alten Pillen, Salben oder Säfte.

Nicht mehr benötigte Medikamente können gemeinsam mit den Restabfällen entsorgt werden. Die Wirkstoffe in den Medikamenten sind so dosiert, dass die Beseitigung in Verbrennungsanlagen für Hausmüll erfolgen kann. Dieser Entsorgungsweg ist sowohl für feste als auch für flüssige Altmedikamente geeignet. Eine ordnungsgemäße Entsorgung von Altmedikamenten ist also über den Restabfallbehälter (graue Tonne) möglich. Lediglich besondere Medikamente, die z.B. erbgutverändernde Substanzen beinhalten (vor allem Zytostatika), sind gesondert zu entsorgen. Diese Medikamente werden allerdings normalerweise nicht an Patienten zur häuslichen Behandlung verschrieben.

Ein mögliches Gefahrenpotential bei der Entsorgung von Altmedikamenten besteht in der Zeit zwischen dem Einwerfen in die graue Tonne und der Entleerung der Behälter ins Müllfahrzeug. Es ist nicht auszuschließen, dass ein auf dem Gehweg bereit gestellter Restabfallbehälter umfällt. Wenn nun alte Medikamente enthalten sind und die „schönen bunten Pillen“ auf dem Gehweg liegen, könnten Kinder diese als „Bonbons“ ansehen.

Um dieses Risiko zu minimieren, empfiehlt der Abfallwirtschaftsbetrieb für die Entsorgung von Altmedikamenten:

- Kleine Mengen alter Medikamente sollten in einem zugebundenen Müllbeutel mit dem Hausmüll vermischt in die graue Tonne gegeben werden.
- Größere Mengen Altmedikamente, die bei Räumung oder Auflösung einer Hausapotheke anfallen, sind bei der Problemstoffsammlung sicherer aufgehoben. Die Altmedikamente werden von dort aus zur Hausmüllverbrennung gegeben. Ein unbefugter Zugriff durch Dritte ist bei der Wahl dieses Weges ausgeschlossen.
- Die Schachteln und Beipackzettel sind getrennt von den Altmedikamenten über die Wertstofftonne zu entsorgen. Pillen und Tabletten sollten nicht aus ihren direkten Verpackungen (Pillenträgerpapier, so genannte Blister) herausgedrückt werden, um einen unmittelbaren Kontakt mit den Medikamenten zu vermeiden.

Auch einige Apotheken nehmen alte und überlagerte Medikamente an. Allerdings ist dies eine Freiwilligkeitsleistung dieser Apotheken. Eine gesetzliche Verpflichtung zur Rücknahme gibt es nicht.

Altmedikamente dürfen nicht in die Toilette

Auf gar keinen Fall dürfen Altmedikamente wie Tropfen oder Säfte sowie Pillen und Tabletten in die Spüle oder Toilette gegeben werden. Leider scheint dieser unzulässige Entsorgungsweg auch eine gängige Praxis der Entledigung alter Medikamente zu sein, da sich Arzneimittelrückstände inzwischen immer häufiger in Flüssen und im Grundwasser nachweisen lassen.

Auskünfte zum Thema erteilt die Abfallberatung unter der Telefonnummer 07222/381-5555 oder können übers Internet unter www.awb-landkreis-rastatt.de abgerufen werden.

APOTHEKE WYSS

Richtiger Umgang mit Arzneimitteln

Hand aufs Herz: sind Sie sicher, dass Sie Ihre Arzneimittel richtig einnehmen und lagern, um eine optimale Wirkung zu gewährleisten?

Richtige Einnahme

Feste Arzneiformen, wie Kapseln oder Tabletten sollten mit genügend Flüssigkeit eingenommen werden. Gewisse Flüssigkeiten wie Kaffee, Tee, Milch oder Fruchtsaft können mit bestimmten Arzneistoffen Wechselwirkungen (Interaktionen) eingehen. So kann die Wirkung von einigen Antibiotika stark abnehmen, wenn man sie mit einem Schluck Milch hinunterspült. Auch Eisenpräparate verlieren einen grossen Teil ihrer Wirkung, wenn sie mit Kaffee oder Tee eingenommen werden. Andererseits können Alkohol oder Grapefruitsaft die Wirkung verschiedener Medikamente verstärken.

Nehmen Sie also Ihre Medikamente mit mindestens einem Deziliter Trinkwasser ein. So können Sie sicher sein, dass die Arzneimittel keinerlei Beeinträchtigung durch störende Stoffe erfahren. Achten Sie darauf, dass Sie beim Schlucken eine aufrechte Haltung einnehmen, und ausreichend grosse Schlucke trinken, damit das Arzneimittel gut rutscht und Schleimhautschäden an der Speiseröhre vermieden werden.

Richtiger Zeitpunkt der Einnahme

Der richtige Zeitpunkt der Einnahme ist sehr wichtig für die optimale Wirkung des Arzneimittels. Gewisse Medikamente werden nüchtern, das heisst 1 Stunde vor oder 2 Stunden nach einer Mahlzeit eingenommen, damit sie besser und schneller aufgenommen werden und der Wirkstoff nicht durch Nahrungsbestandteile beeinflusst wird.
Andere Arzneimittel müssen zum Essen eingenommen werden, damit der Magen nicht unnötig gereizt wird oder weil sie sich im fetthaltigen Milieu einer Mahlzeit besser auflösen.

Bei gewissen Arzneimitteln ist auch die Einnahme zu bestimmten Tageszeiten erforderlich: Cortisonpräparate werden immer am frühen Morgen eingenommen, da dies der natürlichen Ausschüttung im Körper entspricht.

Bei Antibiotika ist auch der zeitliche Abstand zwischen den einzelnen Tabletten wichtig, damit der Wirkstoffspiegel des Medikaments im Blut immer gleich hoch bleibt. Einnahme: alle 12 bzw. alle 8 Stunden.

Wechselwirkungen zwischen Arzneimitteln

Wechselwirkungen zwischen Arzneimitteln kommen häufig vor. Nicht nur bei Medikamenten, welche vom Arzt verordnet sind, sondern auch bei Medikamenten, die Sie rezeptfrei in der Apotheke kaufen oder sogar bei Nahrungsergänzungsmitteln.

Die Wirkung von Medikamenten kann durch gleichzeitige Einname mit gewissen Nahrungsmitteln und Getränken beeinflusst werden.

In der Apotheke prüfen wir jedes Ihrer Rezepte auf Verträglichkeit mit den bereits verordneten Medikamenten. Fragen Sie uns auch bei nicht rezeptpflichtigen Medikamenten, die Sie selber kaufen, ob diese mit Ihrer Dauermedikation zusammen eingenommen werden dürfen.

Richtige Lagerung von Medikamenten

Medikamente sollten möglichst dunkel, bei Raumtemperatur (ca. 20 Grad Celsius) und trocken aufbewahrt werden. Badezimmer und Küche sind ungeeignete Orte, Medikamente zu lagern, da grosse Temperaturschwankungen und hohe Luftfeuchtigkeit herrschen. Die Medikamente müssen so platziert sein, dass sie für Kinder nicht erreichbar sind.

Arzneimittel sollten immer in der Originalverpackung inklusive Beipackzettel aufbewahrt werden. Nur so können Ablaufdatum und Bestimmung des Medikaments überprüft werden.

Gewisse Arzneimittel (z.B. Augentropfen, Sirupe) sind, einmal geöffnet nur begrenzt haltbar. Hier empfiehlt es sich, das Anbruchsdatum mit Kugelschreiber auf der Packung zu vermerken.

Richtige Entsorgung von Medikamenten

Kontrollieren Sie zweimal im Jahr Ihre Hausapotheke auf abgelaufene oder nicht mehr benötigte Medikamente.

Werfen Sie alte Medikamente auf keinen Fall in die Toilette. Sie gelangen sonst in den Wasserkreislauf und belasten die Umwelt.

Medikamente, welche verfallen sind, oder die Sie nicht mehr benötigen, können Sie uns in die Apotheke bringen. Wir entsorgen sie dann für Sie kostenlos und fachgerecht.

Möchten Sie regelmässig von uns über Themen der Gesundheit informiert werden, können Sie sich auch im Internet unter www.apotheke-wyss.ch registrieren lassen.

Apotheke Wyss am Bahnhof
Bahnhofstr. 36
5400 Baden
056 222 48 63
info@apotheke-wyss.ch

Apotheke Wyss im Täfernhof
Mellingerstr. 207
5405 Baden-Dättwil
056 202 30 30
daettwil@apotheke-wyss.ch

Wie sicher sind Medikamente?

- Bund und Kantone überwachen gemeinsam sowohl die Herstellung wie den Verkehr mit Medikamenten.
- Swissmedic, das Schweizerische Heilmittelinstitut, übernimmt die Aufgaben des Bundes, das Amt für Gesundheit und Soziales zusammen mit der Kantonsapothekerin jene des Kantons.

Wo finde ich weitere Informationen?

- Wie es die Werbung empfiehlt: „Lesen Sie die Packungsbeilage oder fragen Sie Ihren Arzt oder Apotheker“.

Gibt es eine unabhängige Auskunftsstelle?

- Eine unabhängige Fach- und Auskunftsstelle über Medikamente ist die Kantonsapothekerin:

  Dr. pharm. Regula Willi-Hangartner
  Postfach 665
  6440 Brunnen

  Telefon 041 820 43 70
  E-Mail regula.willi@sz.ch

  Sie betreut die Kantone Schwyz, Uri, Ob- und Nidwalden sowie Glarus.

Welche Webseiten sind empfehlenswert?

- Arzneimittelkompendium: www.kompendium.ch
- Swissmedic: www.swissmedic.ch
- Kanton Schwyz: www.sz.ch/ags

Departement des Innern
Amt für Gesundheit und Soziales

kantonschwyz

Bitte entsorgen Sie Ihre Medikamente beim behandelnden Arzt oder bei Ihrer Apotheke. Nicht in den Haushaltabfall werfen!

Departement des Innern
Amt für Gesundheit und Soziales

Kollegiumstrasse 28
Postfach 2161
6431 Schwyz

Telefon 041 819 16 65
Telefax 041 819 20 49
E-Mail ags@sz.ch
Internet www.sz.ch/ags

Medikamente

Bezug und Rückgabe
Informationen und Auskunft

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www.sz.ch/ags

Wo kann ich Medikamente im Fachhandel beziehen?

- Für die richtige Anwendung der meisten Medikamente ist eine Fachberatung nötig. Grundsätzlich können Medikamente nur im Fachhandel (Apotheke, Drogerie) bezogen werden.
- Eine Ausnahme bilden die freiverkäuflichen Medikamente wie z.B. Tees und Hustenbonbons, die in allen Ladengeschäften gekauft werden können.
- Bestellungen von Medikamenten über Inserate, E-Mails oder Internet bergen die Gefahr, aus unsicherer, nicht behördlich kontrollierter Quelle zu stammen. So gibt es viele gefälschte, qualitativ schlechte und wirkungslose Präparate, die Ihrer Gesundheit Schaden zufügen können.

Und bei einem Arzt- oder Zahnarztbesuch?

- Ärztinnen und Ärzte sowie Zahnärztinnen und Zahnärzte dürfen Medikamente zur unmittelbaren Anwendung während der Konsultation, in Notfällen, bei Hausbesuchen und zur Sicherung der Erstversorgung abgeben.
- Die meisten Ärztinnen und Ärzte sowie Zahnärztinnen und Zahnärzte dürfen eine Patientenapotheke führen und ihren Patientinnen und Patienten die Medikamente selber abgeben (Selbstdispensation).
- Als Patientin oder Patient haben Sie aber auch das Recht, sich das benötigte Medikament mit einem Rezept verschreiben zu lassen und in der Apotheke zu beziehen.

Was mache ich mit „abgelaufenen“ Medikamenten?

- Bringen Sie Medikamente mit überschrittenem Verfalldatum der abgebenden Stelle zur umweltgerechten Entsorgung zurück.
- Medikamente gehören nicht in den Haushaltabfall! Sie werden vom Kanton umweltgerecht entsorgt.

Wie lange sind Medikamente haltbar?

- Auf jedem Medikament ist ein Verfalldatum aufgedruckt oder eingeprägt.
- Die Haltbarkeit bis zum Verfalldatum gilt bei richtiger Lagerung des Medikaments.
- Einmal geöffnete Packungen wie z.B. Augentropfen, Sirupe, Salben, Gels dürfen oftmals nicht bis zum Verfalldatum gebraucht werden. Gelten nach Anbruch der Packung kürzere Haltbarkeiten, so ist dies in der Regel im Packungsprospekt beschrieben. Die nötige Auskunft erteilt Ihnen auch die Abgabestelle.

Muss es immer eine ganze Packung sein?

- Ja, denn dadurch haben Sie Gewähr, dass keine Medikamente verwechselt wurden.
- Mit der Originalpackung erhalten Sie auch die Packungsbeilage mit der Patienteninformation, auf welche Sie ein Anrecht haben.
- Einzig bei einem Spitalaufenthalt oder in einem Heim wird man Ihnen die verordneten Medikamente einzeln dosiert verabreichen.

Müssen Medikamente mit dem Preis ausgezeichnet sein?

- Ja, für jedes Medikament muss der Verkaufspreis in Schweizer Franken angegeben werden.
- Die Preise für nicht frei zugängliche Medikamente müssen an der Ware selbst angebracht sein.
- Die Preise für frei zugängliche Medikamente (Liste E) können auch durch Preisschilder, Regalanschrift oder Anschlagen von Preislisten bekannt gegeben werden.

Originalpräparat oder Generika?

- Generika sind Nachahmerprodukte von Medikamenten, deren Patentschutz abgelaufen ist. Sie enthalten den gleichen Wirkstoff wie das Original. Weil deren Hersteller keinen Forschungsaufwand abgelten müssen, sind sie billiger als die entsprechenden Originalpräparate.
- Obwohl Generikum und Originalpräparat den gleichen Wirkstoff enthalten, können sie aufgrund der unterschiedlichen Verarbeitung des Wirkstoffs und der verwendeten Hilfsmittel (Bindestoffe, Aromastoffe, Farbstoffe etc.) beim einzelnen Patienten anders als das Originalpräparat wirken.
- Vor dem Wechsel von einem Originalpräparat auf ein Generikum oder umgekehrt sowie vor dem Wechsel innerhalb von Generika ist eine Fachberatung angezeigt.

Kategorien A, B, C, D, E?

- Medikamente sind aufgrund des Nutzen-Risiko-Verhältnisses in fünf Kategorien eingeteilt:

	A	B	C	D	E
Rezeptpflichtig	■	■			
Rezeptfrei			■	■	■
Abgabestellen					
Apotheke, Arzt und Zahnarzt	■	■	■	■	■
Drogerie			[1]	■	■
übrige Ladengeschäfte					■

[1] Nur mit Ausnahmebewilligung

- Nur die Medikamente der Kategorie E können ohne Fachberatung abgegeben werden.

Departement des Innern
Amt für Gesundheit und Soziales

kantonschwyz

Entsorgung von Medikamenten

Bitte geben Sie abgelaufene Medikamente oder solche, die Sie nicht mehr brauchen, Ihrer Abgabestelle (Arztpraxis oder Apotheke) zur fachgerechten Entsorgung zurück.

Medikamente gehören nicht in den Hauskehricht.

NEWS RELEASE

Vancouver Coastal Health

Promoting wellness. Ensuring care.

WANTED: ALL YOUR DRUGS!!!

(**November 20th, 2003**) Leftover and expired medications can be dangerous not only to your health, but also to the environment when disposed of improperly. That's why Vancouver Coastal Health (VCH) wants your unused and expired prescriptions and over-the-counter medications.

Lions Gate Hospital (LGH) is holding its third annual *Rxsponsible* Drug Disposal Program on Tuesday, November 25th and Wednesday, November 26th between 8:00 am and 4:00 pm in the main lobby of the hospital located at 231 East 15th Street in North Vancouver. This program is free of charge and provides staff, physicians and the public with a safe way to dispose of any unused medications that have been sitting around the home or office.

Organized by the BC Community Drug Utilization Program (BC CDUP) with the support of VCH and several pharmaceutical companies, the two-day initiative is aimed at encouraging safe and responsible disposal of unused and expired medications.

"Drugs have an expiry date for a reason," says pharmacist Dr. Anne Nguyen. "At best, drugs lose their potency over time, rendering them ineffective. At worst, expired medications are harmful." For example, kidney damage has occurred when tetracycline (an antibiotic) is used past its expiry date. Expired aspirin (ASA) can be transformed into a new compound that is only used externally for its ability to break down skin, making it dangerous when swallowed.

"Unfortunately, many people get rid of their old drugs by either throwing them into the garbage where they end up in a landfill, or flushing them down the toilet," says Nguyen. Both disposal methods are harmful to the environment. A recent US study of medications in streams found a number of substances including antibiotics, steroids and other prescription and non-prescription drugs.

The program's aim is to encourage people to return their old prescription and over-the-counter medications for safe disposal. In just two years, the program at LGH has prevented more than 100 kilograms of drug waste from entering landfills and sewage systems.

All medications handed over for disposal will be treated confidentially and incinerated within biomedical waste guidelines. Needles and other medical supplies will not be accepted. People unable to make it to LGH are reminded that they can always take their old drugs to their local pharmacy, which will arrange safe and responsible disposal.

For media inquiries, please contact:
Dr. Anne Nguyen
BC Community Drug Utilization Program
Telephone: 604-984-3791

The Return Unwanted Medicines (RUM) Project

The RUM Project is run by a not-for-profit company, The National Return and Disposal of Unwanted Medicines Limited.(ABN 79 082 171 663)

The project enables consumers to return unwanted or out-of-date medicines to any pharmacy, at any time.

The RUM Project has equipped pharmacies throughout Australia with large yellow containers for collection.

The returned medicines are transported for safe disposal.

The project is supported by pharmacists across Australia and funded by the Commonwealth Government to provide for collection and destruction of returned medicines.

The project is supported by :

Pharmaceutical Society of Australia

Pharmacy Guild of Australia

Commonwealth Government of Australia

Council on the Ageing

Australian Institute of Environmental Health

Funded by The Australian Government Department of Health and Ageing

Return Unwanted Medicines

For further information on the RUM Project please phone 1300 650 835 or visit www.returnmed.com.au

Postal Address:
PO Box 2856
CHELTENHAM VIC 3192

Telephone: 03 9583 8699
Facsimile: 03 9583 8533

Return your unwanted medicines to your pharmacy

Return Unwanted Medicines (RUM): The solution to Medicine Waste

Why your medicine cabinet can be a health hazard

Most of the medicines in our medicine cabinet we need, but what about the yellow pills in a jar that's lost its label, and the eye drops with the crystals growing around its seal? And what was so wrong that we were prescribed Quivinrox B-Sulphamate?

Old medicines lying around the home 'just in case' are dangerous...

- ✓ If taken when they're out-of-date
- ✓ If taken when not prescribed for you
- ✓ If in reach of little prying fingers

In an average week, around 50 Aussie kids are admitted to hospital after swallowing medicines not intended for them.

The RUM Project provides the safest and easiest way to dispose of unwanted and out-of-date medicines.

It makes possible the return of all household medicines to any pharmacy at anytime - for free and safe collection and disposal.

Think before you throw

Unwanted medicines are often dumped into the toilet, tipped down the sink or put out with the garbage, which starts a journey that can seriously harm the environment.

More than 300 tonnes of medicines find their way into waterways and landfill every year.

We need to change our behaviours to solve this problem and give the environment a chance.

⚠ Don't flush medicines down the toilet.

Sewerage plants can't treat all chemicals in waste water, resulting in contamination of waterways.

⚠ Don't pour medicines down the sink.

Household medicines contain highly soluble chemicals which when entered into water systems can harm aquatic life.

⚠ Don't throw medicines into the garbage bin.

Household medicines disposed this way end up in exposed landfill sites.

RUM provides a far better alternative

By returning out-of-date and unwanted medicines to our local pharmacy, we can make our home a safer place. Help safeguard our community and protect our environment.

This is all we need to do... it really is easy

Step 1: sort through your medicine cabinet and drawers, putting to one side the out-of-date and unwanted medicines

Step 2: take them to your local pharmacy

Step 3: give them to your pharmacist for proper disposal, and…

Step 4: tell your friends and relatives about the RUM project.