Pharmaceuticals in the water environment

from identification as ‘new substance’ to reduction of emission

Gerard Rijs (RIZA)

24-05-2007

Rijkswaterstaat

Introduction

- **Survey of ‘new’ pollutants**
  - Fragrances, surfactants, brominated flame retardants, endocrine disrupting substances, pharmaceuticals
  - Bacteria and viruses
- **Special attention for group pharmaceuticals**
  - Diversity, social importance, biological active substances
- **Overview activities in NL**
  - Four periods: screening and monitoring substances, contacting stakeholders, increasing public support
- **Emission reduction water-environment (letter Parliament)**
  - **General cost-effective and specific emission reducing actions**

Special attention pharmaceuticals

- **Large diversity of pharmaceuticals**

	active substance	formulation
• humane	850	12.000

  - antibiotics, analgesics, X-ray contrast media, anti-epileptics, cytostatics, ß-blocker, synthetic hormones, anesthetics, tranquilizer, lipid regulators
- **Present in environment; waste-, surface- and drinking water**
- **Biological active substances with possible (coincidental) environmental effects at low concentrations**
- **Perception of consumer about good drinking water**

Overview activities in NL (1)

period	activity	publication
1999 - 2001	**Screening 'new' substances** • Inventory on human and veterinary pharmaceuticals in water environment • Advice of Dutch Health Council 'Environmental risks of pharmaceuticals'	RIZA 2000.051 RIZA 2001.053 Dutch Health Council 2001/17

Overview activities in NL (2)

period	activity	publication
2002 - 2003	**Monitoring**	
	• LOES-research hormone disruptors (EE2)	RIZA/RIKZ 2002.01 RIZA 2003.019 SETAC 2006
	• Monitoring of human pharmaceuticals in waste water, surfacewater, groundwater and drinking water	Kiwa 2003.040 RIVM 703719004 RIWA 9066831065 RIZA 2003.023
	• Survey ecotoxicological effects	AquaSense 1690-4
	• Research veterinary pharmaceuticals in areas with animal husbandry (2007)	RIVM 601500004

Overview activities in NL (3)

period	activity	publication
2004 - 2006	**Attention stakeholders** • National working group 'pharmaceuticals and water environment' Tasks: Interdepartmental communication Reduction environmental impact Members: ministries, registration organisation, drinking water sector, pharmaceutical industry • Chain analysis, list of possible actions for emission reduction, elaboration of the most promising actions, workshop stakeholders	Letter Parliament 28808(35) Working group Grontmij

Overview activities in NL (4)

period	activity	publication
2007 - 2008	**Increase public support** • Reporting Parliament emission reducing actions water environment • Executing actions in letter Parliament 28808 (39): - cost-effective for reducing the emission in general - specific for reducing the environmental impact • Reporting progress of actions to Parliament (2008) • Inventory of policy-related development European countries + ICBR-workshop	Letter Parliament 28808(39) .... ECT ICBR

Policy for emission reduction in NL

- **Cost-effective ‘no regret’ actions for emission reduction in general**
  - Effects on water environment are unknown but not to be excluded
  - Univocal environmental assessments will take many years
  - Autonomous increase of use pharmaceuticals
- **Specific actions for reducing the environmental impact**
  - Perceptible (ecological) effects on water environment
    - hormone (EE2)
  - Problems for the production of pure drinking water
    - X-ray contrast media (iopamidol, iopromide, amidotrizoic acid)
    - anti-epileptics (carbamazepine)

Cost-effective ‘no regret’ actions for emission reduction in general (1)

- **Promote restrictive use**
  - To incorporate the aspect of environment in public information
  - Smaller quantities of medicins per package
- **Green Pharmacy**
  - Promising improvement for the environment (biodegradable medicins, application, dosage)
- **Applicability of Swedish classificationsystem in NL**
  - Environment an additional criterion, next to effectivity, efficiency and patient safety
- **Public nature of environmental data from product registration pharmaceuticals**
  - Improvement of the accessibilty environmental endpoints

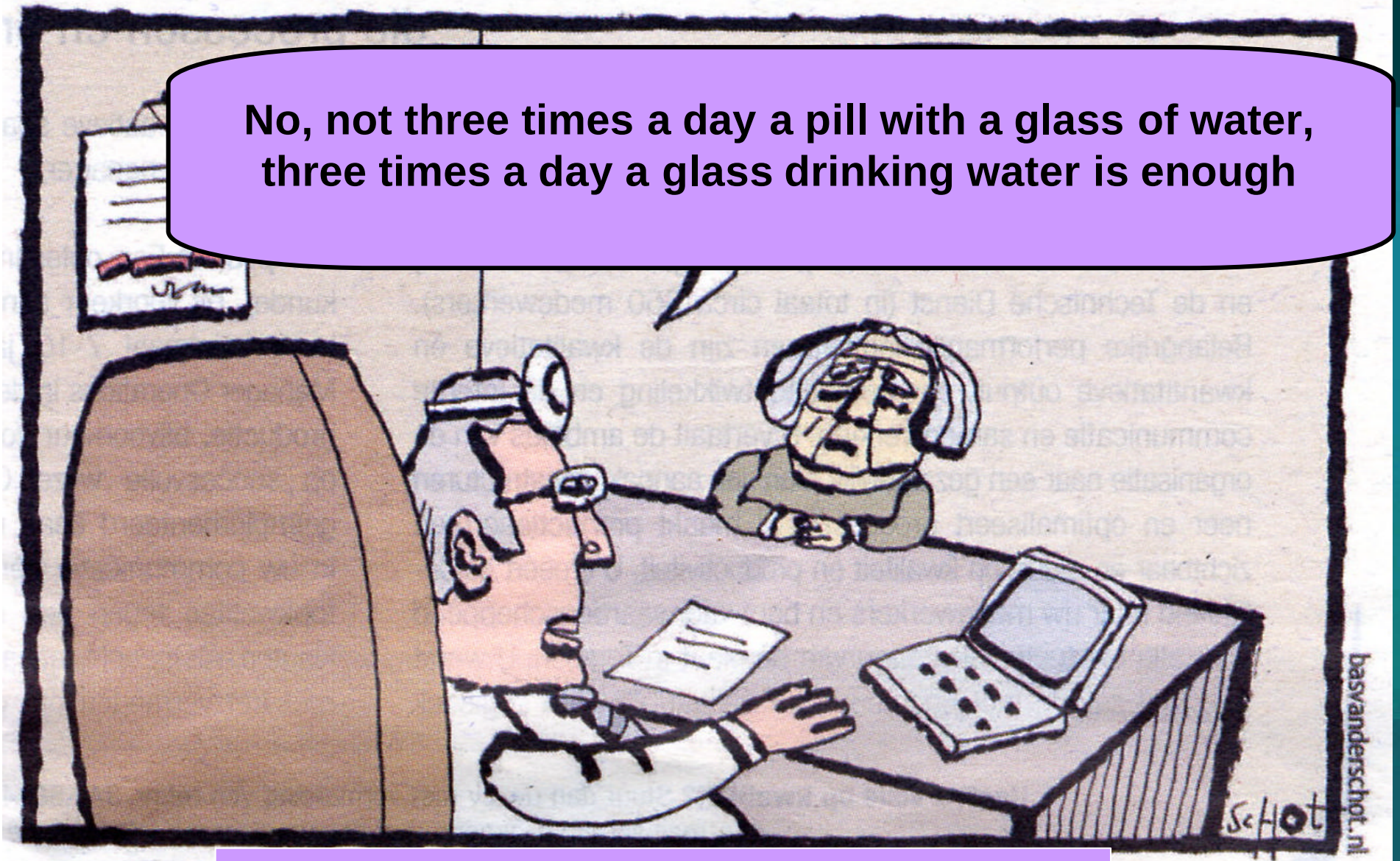
Cost-effective ‘no regret’ actions for emission reduction in general (2)

- **Environmentally aware delivery of not-consuming pharmaceuticals**
  - Public information, collection drugstore/chemical waste bin
- **Emission reduction at hospitals**
  - Pilots emission reduction hospitals
  - Pilots collection of urine from patients following a cure
- **Additional polishing-technique for sewage treatment plants**
  - Co-operation with pilots for additional treatment within the Water Framework Directive

Specific actions for reducing the environmental impact

- **Covenant**
  - Green pharmacy
  - Specific agreements for ‘problem pharmaceuticals’ ecotoxicological effects / production drinking water
  - Result-oriented
  - Public support

Bas van der Schot



Pharmaceuticals in drinking water

Discussion / statements (1)

- **Cost-effective actions are desired since:**
  - Effects on water environment are unknown but not to be excluded in advance
  - Univocal environmental assessments will take many years for such a large diversity of (combinations of) pharmaceuticals at low concentrations and long exposure period
  - Autonomous increase of use pharmaceuticals

Discussion / statements (2)

- What are the possibilities for the Rhine river states for an effective approach for emission reduction, if environmental effects are not included in the decision of the EU registration process for pharmaceuticals?

Discussion statement (3)

- **The ICBR could start initiatives to reduce emissions of pharmaceuticals that cause problems within the drinking water production, because of the perception of consumers. Starting with the pharmaceuticals which are mentioned in the list of Rhine substances:**
  - **X-ray contrast media (iopamidol, iopromide, amidotrizoic acid)**
  - **Anti-epileptics (carbamazepine)**
  - **Diclofenac, bezafibrate?**
  - **Cytostatics?**