1st PRIZE

DEVELOPMENT OF A WEB-BASED ANTIMICROBIAL RESOURCE TO IMPROVE ANTIMICROBIAL PRESCRIBING Ñ A TWO YEAR REVIEW


Background Our Teaching Hospitals were poorly performing for Clostridium difficile infection (CDI) and MRSA bacteraemia, despite ‘CDIfriendly’ antibiotics used in patients >80 years.

Purpose The project was to build a web-based infection-management resource to improve antimicrobial prescribing by providing:

► evidence-based, peer-reviewed guidelines
► educational resource
► audit resources with results
► decision support including calculators

Material and Methods Templates were developed for each guideline development team of a clinician, microbiologist and pharmacist. Each guideline includes algorithms, investigations, empiric and directed therapy (including special populations), oral switch, duration, specialist referral criteria, references, review dates, and evidence levels. Drafts are peer reviewed for 4 weeks where they are endorsed without changes or with minor revision, or need a major revision. Guidelines are updated based on comments, and repeat peer-review if necessary. Once ratified, uploaded to Antimicrobial Resource website.

Results

► 104 guidelines developed; average 73 draft views; 7 comments per draft (3 had second peer-review)
► >7000 hits/month
► Antimicrobial prevalence decreased from ~35% to ~25%
► CDI decreased from ~80 to ~20 cases/month

Discussion Many Trusts use pocket-sized guidelines which go out of date. Our pathways focus on diagnosis and investigations, with antimicrobials if necessary. Development processes promotes ownership and subsequent usage. Feedback mechanisms ensure continual update. Less patients are on antimicrobials or develop CDI. Changes in prescribing may have contributed.

Conclusion Web-based, evidenced-based, peer-reviewed antimicrobial guidelines are an effective method to support prescribers in their diagnosis and treatment of infection. Links to resources such as eBNF, eMC and dose calculators improve patient safety. Feedback processes with regular update ensure that guidelines are always up-to-date. Guidelines designed and delivered in this manner promote usage, and when combined with other elements of antimicrobial stewardship, is associated with a decrease in the prevalence of antimicrobial usage and reductions in some HCAIs.

No conflict of interest.
Development of a Web-Based Antimicrobial Resource to Improve Antimicrobial Prescribing - A Two Year Review

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WHAT CAN HOSPITAL PHARMACISTS DO FOR PATIENT SAFETY WHEN ENCOUNTERING POTENTIALLY COUNTERFEIT MEDICINES PURCHASED BY PATIENTS OVER THE INTERNET

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Background The popularity and the number of internationally operated illegal online drugstores that are selling medications without prescriptions or deliver products with unknown origins are rising. As Europeans are spending billions of Euros on the illicit medicines market the chances of accidental overdose, drug interactions and toxicity is increasing.

Purpose To estimate the significance of the problem in Hungary and to define adequate methods to assess the quality and potential danger of drugs sold online.

Material and Methods The attitude of more than 500 patients regarding purchasing drugs online was evaluated in our survey implemented in hospital (n=107) and community pharmacy (n=434) setting. A comprehensive methodology was set up by our institution which allows general and professional quality assessment by:

- Standardised ranking method of online drugstores
- Documentation, evaluation of distribution process
- Identification of microbiologic contamination
- Measurement of physical properties by pharmacotechnology methods
- Chemical analysis of active substance

Results Our results show that nearly 5% of the respondents of the questionnaire have ordered drugs or dietary supplements online and about same amount of people are considering this option in the near future. 163 online pharmacies were evaluated and followed for 28 months. Less than 7% of the sites require prior medical prescription and 38% do not exist after two years. Out of the thirteen medications (paracetamol, sildenafil, tramadol) test ordered, 11 arrived (85%). Main components were identified (HPLC, spectrophotometry) in all samples. Compared to original authorized medications, higher chemical contamination was observed, indicating lower quality ingredients. The increased microbiological contamination and the higher standard deviation of pharmacotechnology parameters suggest poor quality control of production.

Conclusion Our observations not only draw the attention of hospital pharmacists to illegal online drugstores and counterfeit medicines but also suggest a comprehensive methodology for professional pharmaceutical quality assessment of medication ordered online.

No conflict of interest
What can hospital pharmacists do for patient safety when encountering potentially counterfeit medicines purchased by patients over the internet

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Buying medicine online: protecting patients is a new challenge for pharmacists

The popularity and the number of internationally operated illegal online drugstores that are selling medications without prescriptions or deliver products with unknown origins are rising. As Europeans are spending billions of Euros on the illegal medicines market, the chances of accidental overdose, drug interactions and toxicity is increasing. The national and international regulation of these sites is currently an unsolved problem world-wide.

The purpose of our work is to assess the current situation of ordering of online medicines in Hungary, to survey the attitude of patients regarding online drug purchase, to define adequate methods to determine the quality and potential danger of drugs sold online and to recommend useful tools for pharmacists to improve patient safety.

People are willing to buy their medicine online, but are not fully aware of the risks

The attitude of 856 patients regarding purchasing drugs online was evaluated in our survey, which was implemented in hospital (n=422) and community pharmacy (n=434) setting in ten Hungarian cities. Our results show that 7.3% of the respondents of the questionnaire have ordered drugs or dietary supplements online and 5.8% are considering this option in the near future. These numbers are expected to increase, because every sixth respondent (16.3%) would buy such products from foreign websites if lower prices are offered. Majority of the patients (78.8%) don’t know anything about the quality of medicines purchased online, only ten percent think that medicines in conventional community pharmacies have higher quality.

Effective methods can be used for the evaluation of quality of medicines purchased over the internet

A comprehensive methodology was set up which allows general and professional quality assessment of websites and medicines purchased online. Each tool focuses on critical indicators of professionalism, quality and patient safety. The essentials, the applied techniques and the results of each tool are described below.

- **Evaluation of websites**
- **Distribution and packing**
- **Microbial contamination**
- **Pharmaceutical procedures**
- **Physicochemical analysis**

A brief tool was developed for the evaluation of internet pharmacies and the potential quality and safety of counterfeit and substandard properties of the delivered drugs. By inspecting the arrived parcel, a few signs can indicate illegal activity or the absence of quality standards. The following questions should be checked:

1. **Identification of the supplier**
   - Did the package arrive?
   - Does the address match the name and address of the supplier?
   - What is the legal currency of the website?
   - Were the order and delivery conditions met?
2. **Guarantees for patient safety**
   - Guarantees for patient safety
   - Necessity of prescription from a doctor, completeness of product description and patient information leaflet, quality of online medical questionnaire must be surveyed.

By the calculation of the weighted score total, the risk of inappropriate medication use, identity and credit card theft, or the likelihood of buying the counterfeit must be set against the counterfeit and substandard properties of the delivered drugs can be estimated.


Chromatographic separation techniques and absorption spectrophotometry allow the measurement of the active substance and the identification of impurities in the product.

- Identification of substances by typical spectrum.
- Thin layer chromatography is suitable for parallel qualitative measures.
- High performance chromatography is capable of precise quantitative measurements, identification of minor components and impurities.

The results of physicochemical analysis show a "fingerprint" of the product that can be compared to the original authorized medications. Potential counterfeiters can be identified if the quantity of active ingredient differs significantly, or impurities indicate use of substandard raw materials for manufacturing.

What hospital pharmacist can do for patient safety

Pharmacists and hospital pharmacists can play an essential role in:

1. **PREVENTION**
   - by drawing patients’ attention to potential dangers of medicines bought online

2. **SCREENING**
   - for uncontrolled prescription drug use by Medication History Worksheet

3. **EVALUATION**
   - of internet pharmacies according to professional principles, of medicines by the introduced pharmaceutical methods.
3rd PRIZE

MERCAPTOPURINE SUSPENSION 10 MG/ML


Background Internationally, the WHO emphasizes the importance of developing new paediatric medicines. In the Netherlands, this importance is generally recognized. When industry does not provide suitable preparations, formulations should be developed for small scale compounding in public or hospital pharmacies. To this aim, the Royal Dutch Association of Pharmacists (KNMP) cooperates closely with the Special Interest Group on Paediatric Medicine of the Dutch Association of Hospital Pharmacists (NVZA). One of the developed formulations is Mercaptopurine suspension 10 mg/ml.

Purpose Mercaptopurine is practically insoluble in water. This means that an oral, liquid preparation with mercaptopurine is only feasible as a suspension. Literature suggests that ascorbic acid should be added as anti-oxidant, to protect mercaptopurine for oxidation. The need for an anti-oxidant is doubted, because the mercaptopurine will be merely suspended and is not dissolved. A stability study has been performed on two formulations, with and without ascorbic acid. Aim of the study is to find a formulation that yields a stable suspension for at least 6 months.

Material and methods Several batches of mercaptopurine suspension 10 mg/ml were prepared in a standard suspension base, with and without ascorbic acid. The batches, packed in PET-bottles, were kept at 25 °C for 6 months. Samples were taken at 0, 1, 3, 6 and 9 months, and were analysed for appearance, pH, viscosity, related substances and content of mercaptopurine. For the assay a stability-indicating HPLC-method was used, based on the Ph.Eur. monograph for the active ingredient.

Results and conclusion All suspensions show stability for at least 6 months, regarding the content of mercaptopurine. The addition of ascorbic acid has no additional value. On the contrary, ascorbic acid causes a slight colouration of the suspension, while the viscosity decreases in time. This is unwanted in regard to the physical stability. It is concluded that a formulation without ascorbic acid yields the most stable suspension.

Literature


No conflict of interest
Mercaptopurine suspension 10 mg/ml

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Objectives
Internationally, the WHO emphasizes the importance of developing new paediatric medicines. In the Netherlands, this importance is generally recognized. When industry does not provide suitable preparations for children, formulations should be developed for small scale compounding in public or hospital pharmacies. To this aim, the Royal Dutch Pharmacists Association (KNMP) cooperates closely with the Special Interest Group on Paediatric Medicine of the Dutch Association of Hospital Pharmacists (NVZA). One of the developed formulations is Mercaptopurine suspension 10 mg/ml. Mercaptopurine is practically insoluble in water. This means that an oral, liquid preparation with mercaptopurine is only feasible as a suspension. Literature suggests that ascorbic acid should be added as anti-oxidant, to protect mercaptopurine against oxidation. The need for an anti-oxidant is doubtful, because the mercaptopurine will be merely suspended and is not dissolved. Aim of the study is to find a formulation that yields a stable suspension for at least 6 months.

Methods and study design
Several batches of mercaptopurine suspension 10 mg/ml were prepared in a standard suspension base, with and without ascorbic acid in a concentration of 1 mg/ml. The composition of the batches is shown in table 1. The batches, packed in PET-bottles, were kept at 25 °C for 6 months. Samples were taken at 0, 1, 3, 6 and 9 months, and were analysed for appearance, pH, viscosity, related substances and content of mercaptopurine. For the assay a stability-indicating HPLC-method was used, based on the Ph.Eur. monograph for the active ingredient.

Table 1: Composition of Mercaptopurine suspension

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercaptopurine</td>
<td>1</td>
</tr>
<tr>
<td>Acudium vitamin monohydr. cyst.</td>
<td>74</td>
</tr>
<tr>
<td>Aluminium magnesium silicate</td>
<td>991</td>
</tr>
<tr>
<td>Carmelose sodium M</td>
<td>991</td>
</tr>
<tr>
<td>Methylis parahydrobenzoas</td>
<td>74</td>
</tr>
<tr>
<td>Stipix alinesplex</td>
<td>26</td>
</tr>
<tr>
<td>Aqua purificata</td>
<td>77.87</td>
</tr>
</tbody>
</table>

Results
All suspensions show satisfying stability for at least 6 months at 25 °C, regarding the content of mercaptopurine (figure 1). Only the viscosity of a suspension with ascorbic acid is considerably lower than a suspension without ascorbic acid, and furthermore, viscosity decreases in time (figure 2). The decrease does not have a measurable effect on the homogeneity of the suspension.

Discussion
The results of the study show that addition of ascorbic acid has no additional value regarding the mercaptopurine content. However, ascorbic acid causes a slight colouration of the suspension, while the viscosity decreases in time. Although no effect on the homogeneity is observed, a decrease in viscosity is considered as an unwanted effect in regard to the physical stability of the suspension.

Conclusion
It is concluded that a formulation without ascorbic acid yields a stable suspension, which can be stored for 6 months at 25 °C.

Literature

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