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Welcome to today’s session

SIGN 4 - Medicines use and quality

DATE 13 October 2020  TIME 13.00 - 14.30 CEST

Paul Sinclair (Event Chair)
Chair of the Board of Pharmaceutical Practice
FIP (Australia)

Tamara Peiró Zorrilla
General Pharmaceutical Council of Spain
(Spain)

Jan Saevels
Scientific Director
Association of Pharmacists Belgium (APB)
(Belgium)

Jephney John Redford Jacquet
Haitian Pharmacy Students Association
(Haiti)
Speaker

Tamara Peiró Zorrilla
General Pharmaceutical Council of Spain

Presentation on
AdherenciaMED: adherence management service

Award winner of Pharmacy Practice Improvement Programme Award 2020
Background

- Lack of adherence to treatments is one of the **main challenges** for healthcare professionals and health care systems.

- **Approximately 50%** of patients with chronic diseases are non-adherent to their treatments\(^1\)

- Non adherence is estimated to cause annual expenditure of **EUR 11,250 million in Spain**\(^2\)

- Community pharmacists can improve medication non-adherence through patient tailored complex interventions.

Background

WHAT IS AN ADHERENCE MANAGEMENT SERVICE IN SPAIN?

This is the professional service in which the pharmacist, through his or her intervention, actively collaborates with the patient so that, on a voluntary basis, he or she can follow the recommendations of the health professionals regarding the appropriate process for the use of medicines and healthcare products, the hygienic-dietary habits and/or the lifestyle, in order to achieve the expected results in the patient's health*.

Background
Objectives

Explore the project, test and improve materials and methods

Assess the clinical, economic and humanistic impact of the professional pharmacy service

Development and assessment of an implementation programme for the services
Impact Phase

138 pharmacists – 98 community pharmacies – 1,186 patients involved
Purpose

To evaluate the **clinical and humanistic impact** of a **community pharmacist-led adherence service** in patients with chronic conditions (Hypertension –HBP-, Asthma or Chronic Obstructive Pulmonary Disease -COPD-) **compared to usual care.**

**Patients inclusion criteria**

- > 18 years old
- Patients who are able to complete EuroQol-5D, Morisky, ACQ and CCQ questionnaires on their own
- Who signed an informed consent form
- In treatment for:
  - Hypertension
  - Asthma
  - COPD
Methods

• A cluster randomized controlled trial was conducted in community pharmacies, divided in two groups, control and intervention group.

• Patients in intervention group received a tailored service aiming at identifying and addressing non-adherence, using brief complex interventions based on evidence-based models for behavioural change.

• Patients in the control group received the usual care.

• All patients received a monthly follow-up for six months.
For intentional adherence:

- Necessity and Concerns Model
- Health Belief Model
- Transtheoretical Model for Change
- Motivational Interview

For unintentional adherence:

- Model Information - Motivation-Strategy
- Transtheoretical Model for Change
- Motivational Interview
- Pharmacist Counselling
- Dose administration aids
- Education in inhalation technique

Outcomes

- 138 participating **pharmacists** working in **98 Community Pharmacies** from the 6 Provincial Pharmacists Chambers

- The study included **1,186 patients** (633 intervention group and 553 control group), of whom **42.3%** were patients with **HBP**, **32.5%** with **asthma** and **25.2%** with **COPD**

- Fieldwork lasted **6 months** and was facilitated by the Practice change Facilitator (FoCo)

- Data recorded in an Electronic Recording System
Outcomes

Effectiveness of service: prevalence of adherence

- 50% increase of adherent patients in the intervention group versus 20% increase of adherent patients in the control group.

- At the end of the study, the proportion of adherent patients in the intervention group was significantly higher (89.2%) compared to the control group (66.2%) (p<0.0001).
Outcomes
Effectiveness of service: Correct inhalation technique

✓ Increase of patients with correct inhalation technique:

+ 40.7% for Asthma
+ 38.6% for COPD

Prevalence of correct inhalation technique - Asthma

✓ At end of study 90% patients had correct inhalation technique
Outcomes

Clinical impact - Health outcomes

**Asthma control**

Punctuation ACQ: decrease of 0.5 points in IG (p<0.0001)

Significant increase of **30% in patients controlled**

**COPD control**

Punctuation CCQ: decrease of 0.58 points in IG (p<0.0001)

Significant increase of **22% in patients controlled**

**Hypertension Control**

Decrease in diastolic levels

Increase of **13% in patients controlled**
Outcomes

Humanistic impact – Quality of life

Humanistic impact was measured through medication adherence and health-related quality of life perceived by the patient (EuroQol)

- **Almost 5 points of improvement using** Visual Analogic Scale (VAS) in the patient **perceived quality of life** between both study groups

- **By pathologies:**
  - higher increase in asthma patients (8.94 points)
  - lower in COPD (3.97 points) and hypertensive patients (5.43 points)
Outcomes

Economic impact – cost utility

✓ Service proved to be cost effective with ICER of 753€/QALY.

✓ Cost associated 25,47€ per patient (6 months): 4,25€ patient / month.

✓ Proposed remuneration of 5,5€ patient / month
Implementation Phase

127 pharmacists – 90 community pharmacies – 850 patients involved
Why do we work on Implementation?

The implementation of a Professional Pharmaceutical Care Service is a complex and multifactorial process that requires a guided procedure to achieve it.

The "Implementation Science", studies how to integrate the results in the daily practice.

The implementation is determined by implementation factors, distributed along different domains, that interact with each other.
Practice Change Facilitator

- External support
- Contribute in the practice changes
- Support and advisory work
- On-site visits to community pharmacies
- Individually designed strategies \(^1,^2\)

What Practice Change Facilitator do?

- Periodic analysis of unmet needs
- Identification of barriers, facilitators and causes that influence the implementation.
- Situation analysis and FoCo interventions.
- Evaluation of the whole process for each pharmacy.
- Evaluation of the "Service Integration".
- Evaluation of the "Fidelity of pharmacists to the protocol".
Purpose

To develop and evaluate an implementation programme of a community pharmacist-led adherence service design before

Specific objectives

✔ To Evaluate the implementation of the Service through the different stages of the implementation model
✔ To evaluate the facilitation process for the implementation of the Service
✔ To evaluate the clinical and humanistic results of the Service during the Implementation phase and in contrast the results obtained during the Impact phase
✔ To evaluate the maintenance of the clinical and humanistic results obtained during the Impact phase
Methods

- Hybrid design effectiveness – implementation
- Theoretical framework FISpH (Framework for the Implementation of Services in Pharmacy)*

Outcomes

• **127** participating **pharmacists** working in **90 Community Pharmacies** from the same Provincial Pharmacists Chambers

• The study included **850 patients** of whom **51%** were patients with **HBP**, **27%** with **asthma** and **22%** with **COPD**

• Fieldwork lasted **6 months** and was facilitated by the Practice change Facilitator (FoCo)

• Data recorded in an Electronic Recording System
Outcomes

Implementation outcomes – daily practice

- 76 community pharmacies from Impact phase agreed to continue during the Implementation phase

- 75% pharmacies fully implement the service at 6 months with $\geq 7$ patients

- Only 6.7% pharmacies were lost during the study
Outcomes
Implementation outcomes – daily practice

✓ 850 patients recruited. 92% completed the study

✓ High fidelity to the protocol (4.07/5)

✓ Greater fidelity to the protocol in pharmacists from the Impact intervention group

✓ Moderate Service integration in 6 months

![Graph showing patients per month](image)
Outcomes

Implementation outcomes – Practice Change Facilitators

- **506 visits** in 6 months
- **1,096 implementation factors** identified:
  - 410 barriers → 307 solved (74.9%)
  - 686 facilitators → 598 used successfully (87.2%)

Facilitators:
- External support (30.2%)
- Personal characteristics (5%)
- Previous experience (5%)

Barriers:
- Service methodology (13.5%)
- Records (12%)
- Time (9.8%)
Outcomes

Effectiveness of service

At the beginning of this phase, 64.9% of the patients included were adherent (the most adherent patients came from the intervention group of the previous phase who has been followed the previous 6 months)

After six months of follow-up, the number of adherent patients increased by 22.8% (particularly the newly included patients in this phase)

The clinical and humanistic results of the Impact phase were confirmed, showing similar trends for all study variables
Conclusions

This study has shown a community pharmacist-led intervention improves medication adherence, clinical outcomes and health-related quality of life in patients with hypertension, asthma and COPD.

Success factors:
- Practice change
- Facilitators as facilitators of practice change
- A structured work protocol
- eRecording data

Difficulties were:
- Put theory into practice
- Promotion of behavioural changes are not incorporated in usual pharmacist training
- Further adaption of electronic data collection to daily practice
Thank you for your attention

tamarapeiro@redfarma.org
Speaker

Jan Saevels, PharmD, PhD
Scientific Director - Association of Pharmacists Belgium (APB)

Presentation on
National quality improvement programme on compounded medicines

2020 Award Winner of Pharmacy Practice Improvement Programme Award
National quality improvement programme on compounded medicines

APB – ASSOCIATION OF PHARMACISTS BELGIUM

- National federation of professional associations of independent community pharmacies
- Representing >95% of independent pharmacies and >85% of all community pharmacies in Belgium
- Our mission: Support, develop and promote the community pharmacist’s added value to the benefit of the patients’ health
- Staff: ~120 in Brussels
- Medicines Control Laboratory (post-marketing quality surveillance of medicines on the market)
National quality improvement programme on compounded medicines

Quality of compounded medicines

- Council of Europe Resolution CM/Res(2016)1 on quality and safety assurance requirements for medicinal products prepared in pharmacies for the special needs of patients
- Individual preparations for single patients – full (destructive) testing of end product is not possible
- 2017: APB agrees with Federal Minister of Health to set up a new programme
National quality improvement programme on compounded medicines

**Objective**

- “A voluntary but systematic quality control of pharmacy preparations, and associated support for pharmacists with the aim to guarantee and improve (where necessary) the quality of pharmacy preparations"
- Available for all Belgian community and hospital pharmacies
- Free of charge for participating pharmacies
- Close collaboration with
  
  *The Federal Agency for Medicines and Health Products (FAMHP)*
  
  *The Belgian Cooperative Pharmacies Office (OPHACO)*
  
  *Hospital Pharmacists of Belgium*
National quality improvement programme on compounded medicines

*Methodology - general*

- Simultaneous preparation of a predefined formula by about 100 voluntarily participating pharmacies (= 1 “cycle”)
- Inspection of preparation report, packaging and label, analytical aspects
- Individual feedback to pharmacy + follow-up of non-conformities
- Publication of anonymised global results, with an important sensitizing and quality enhancing impact, also for non-participating pharmacists
National quality improvement programme on compounded medicines

Methodology – details of a cycle

Registration → Selection → Preparation → Analysis → Feedback → Publication
National quality improvement programme on compounded medicines

*Methodology – details of a cycle*

**Registration**

**Selection**

**Preparation**

**Analysis**

**Feedback**

**Publication**

<table>
<thead>
<tr>
<th>Numéro</th>
<th>Titre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gouttes oculaires à 0,5% d’atropine</td>
</tr>
<tr>
<td>201810</td>
<td>Gélules à 0,5 mg de dexaméthasone</td>
</tr>
<tr>
<td>201801</td>
<td>Gélules à 50 mg de sulpiride FTM</td>
</tr>
<tr>
<td>201802</td>
<td>Crème hydrophile à 10% d’urée FTM</td>
</tr>
<tr>
<td></td>
<td>Bain de bouche à l’hydrocortisone, lidocaïne chlorhydrate et nystatine FTM</td>
</tr>
<tr>
<td>201809</td>
<td>Suspension pédiatrique à 2 mg/ml d’omépazole FTM</td>
</tr>
</tbody>
</table>
National quality improvement programme on compounded medicines

Methodology – details of a cycle

- Registration
- Selection
- Preparation
- Analysis
- Feedback
- Publication

- Voluntary participation
- Preference for new participants
- Mix of community and hospital
- Notification www and e-mail
- Instructions by mail
National quality improvement programme on compounded medicines

Methodology – details of a cycle

Registration › Selection › Preparation › Analysis › Feedback › Publication

› Dummy prescription | › Usual preparation protocol | › Pharmacy raw materials | › Return preparation in the supplied packaging
National quality improvement programme on compounded medicines

Methodology – details of a cycle

- Registration
- Selection
- Preparation
- Analysis
- Feedback
- Publication

› Packaging and labeling
› Preparation report
› Laboratory analysis: identity, assay, mass uniformity, content uniformity, homogeneity, microbiology, sterility, etc.
National quality improvement programme on compounded medicines

Methodology – details of a cycle

Registration
Selection
Preparation
Analysis
Feedback
Publication

› Personal report published
› Notification by e-mail
› Advice on non-conformities
› Document in Quality Manual
National quality improvement programme on compounded medicines

Methodology – details of a cycle

Registration ➔ Selection ➔ Preparation ➔ Analysis ➔ Feedback ➔ Publication

› Always anonymised results
› Professional press articles
› Feedback to FAMHP (National Formulary)
### National quality improvement programme on compounded medicines

**Variety in pharmaceutical forms**

<table>
<thead>
<tr>
<th>2017 &amp; 2018</th>
<th>2019 &amp; 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Hydrocortisone acetate 1% hydrophilic cream</td>
<td>○ Folic Acid 2% trituration</td>
</tr>
<tr>
<td>○ Hydrocortisone 20 mg capsules</td>
<td>○ Xylometazoline HCl 0,1% nasal drops</td>
</tr>
<tr>
<td>○ Chlorhexidine 0,05% solution</td>
<td>○ Flufenamic acid 3% gel</td>
</tr>
<tr>
<td>○ Sulpiride 50 mg capsules</td>
<td>○ Cholecalciferol 800 IU capsules</td>
</tr>
<tr>
<td>○ Urea 10% hydrophilic cream</td>
<td>○ Erythromycine 4% solution</td>
</tr>
<tr>
<td>○ Omeprazole 2 mg/mL suspension</td>
<td>○ Colloidal silver 150 mg suppositories</td>
</tr>
<tr>
<td>○ Dexamethason 0,5 mg capsules</td>
<td>○ Levocarnitine 200 mg/mL solution</td>
</tr>
<tr>
<td>○ Atropine 0,5% eye drops</td>
<td>○ Nystatin 100,000 I.U./g hydrophilic cream</td>
</tr>
<tr>
<td>○ Hydrocortisone, lidocaine &amp; nystatin mouth bath</td>
<td>○ Salicylic acid 20 % hydrophobic ointment</td>
</tr>
<tr>
<td></td>
<td>○ Hydrocortisone 1% acid ear solution</td>
</tr>
<tr>
<td></td>
<td>○ Nitrofurantoin 15 mg capsules</td>
</tr>
<tr>
<td></td>
<td>○ etc.</td>
</tr>
</tbody>
</table>
National quality improvement programme on compounded medicines

*Sulpiride 50mg capsules*

- **Samples**: 102
- **Identification**: 102 compliant
- **Assay**: 102 compliant
- Both lactose and mannitol based excipients are possible
National quality improvement programme on compounded medicines

*Hydrocortisone acetate 1% hydrophilic cream*

- **Samples**: 95
- **Identification**: 95 compliant
- **Assay**: 95 compliant
- **Homogeneity**: 93 compliant
- **Microbiology**: 88 compliant
  - TAMC 5 non-compliant
  - TYMC 7 non-compliant
- No pathogens

![Assay Graph](image-url)
National quality improvement programme on compounded medicines
*Hydrocortisone 20mg capsules (2017)*

- **Samples**: 94
- **Identification**: 93 compliant
- **Assay**: 31 compliant
  - Mean of assays: 90.5%
  - Systematic underdosage
National quality improvement programme on compounded medicines

*Hydrocortisone 20mg capsules (2019)*

- **Samples**: 106
- **Identification**: 106 compliant
- **Assay**: 99 compliant

*New preparation protocol*

*Compliance from 62% to 92%*
National quality improvement programme on compounded medicines

Atropine 0,5 % eye drops

- **Samples**: 26
- **Identification**: 26 compliant
- **Assay**: 24 compliant
- **Sterility**: 26 compliant
- Sterile compounding in community pharmacy is possible!
National quality improvement programme on compounded medicines

*Dexamethason 0.5 mg capsules*

- **Samples**: 103
- **Identification**: 103 compliant
- **Assay**: 77 compliant
- **Content Uniformity**: 102 compliant
- Calculation errors!
- Use of intermediate dilution (trituration) adds variability in final result

![Graph showing data distribution](image)
National quality improvement programme on compounded medicines
Levocarnitine 200 mg/mL oral solution

- **Samples**: 20
- **Identification**: 20 compliant
- **Assay**: 20 compliant
- **Microbiology**: 18 compliant
- **Use of preservatives**
**National quality improvement programme on compounded medicines**

**Conclusions**

- Program started in 2017 – reached maturity in 2020
- 10 cycles per year
- 1 out of 5 pharmacies have already participated in a voluntary program
- Quality improvement on individual pharmacy level
- Quality improvement on macro-level with better preparation protocols
- Quality assurance of the production process **IN** the pharmacy, **CLOSE** to the patient is extremely relevant!
- The 2020 FIP Pharmacy Practice Improvement Award is a huge recognition of continuous efforts of a great team!

« **Quality is not an option** »
National quality improvement programme on compounded medicines
https://www.youtube.com/watch?v=UEHJhU4-cTM
Thank you for your attention
Speaker

Jephney John Redford Jacquet
Haitian Pharmacy Students Association

Presentation on
Substandard Quality of the Antimicrobials Sold in the Street Markets in Haiti

On behalf of:
Théodule Jean-Baptiste, John Carpenter, Kevin Dahl, Wellington Derameau, Rosemela Veillard, Osselyn Pierre Ludens, John Redford Jacquet, Albert Figueras
Introduction

• According to the World Health Organization (WHO) Global Surveillance and Monitoring System, an estimated 1 in 10 medical products circulating in low- and middle-income countries are either substandard or counterfeit [1,2].

• One of the most important causes of AMR is an inappropriate use of antibiotics
• Antibiotics and antimalarials are the most commonly counterfeit medicines

• Selling medicines in street markets, Specifically antimicrobials, are common practice in Haiti. That’s why we designed the present pilot study with the main purpose of analysing the quality of the antimicrobials sold in the street markets of Port-au-Prince.
Materials and Methods

- We identified and selected 28 frequented public markets in the eight communes of Port-au-Prince (Haiti) and Four research assistants bought different brands of antimicrobials products in them.
- We analysed half of the content of pack, which was five units with an Handheld Raman Spectrometer.
- **Hit Quality Index** a probabilistic approach expressed as a p-value or a correlation algorithm between the tested component and library reference spectra.
- In our study, a HQI greater or equal to 90 was considered to be a “good spectral match” between the analysed units and their authentic counterpart.
### Street Markets List where we bought the samples

<table>
<thead>
<tr>
<th>Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Boisthor</td>
</tr>
<tr>
<td>-Brochette</td>
</tr>
<tr>
<td>-Gerald Bataille</td>
</tr>
<tr>
<td>-Carrefour Marassa</td>
</tr>
<tr>
<td>-Marche Bizoton</td>
</tr>
<tr>
<td>-Marche de Cazeau</td>
</tr>
<tr>
<td>-Marche d'Arcachon 32</td>
</tr>
<tr>
<td>-Marche de Croix des Missions</td>
</tr>
<tr>
<td>-Marche de Croix des Bouquets</td>
</tr>
<tr>
<td>-Marché de Damien</td>
</tr>
<tr>
<td>-Marche de Puits Blain</td>
</tr>
<tr>
<td>-Marche de Marin</td>
</tr>
<tr>
<td>-Marche de Tabarre</td>
</tr>
<tr>
<td>-Marche de Sarthe</td>
</tr>
<tr>
<td>-Marche Duvalier</td>
</tr>
<tr>
<td>-Marche en Fer</td>
</tr>
<tr>
<td>-Marche Salomon</td>
</tr>
<tr>
<td>-Marche Lalue</td>
</tr>
<tr>
<td>-Marche Telele</td>
</tr>
<tr>
<td>-Marche Se Radôt</td>
</tr>
<tr>
<td>-Poste Bon Repos</td>
</tr>
<tr>
<td>-Place Clercine</td>
</tr>
<tr>
<td>-Route de Delmas 32</td>
</tr>
<tr>
<td>-Rue des Miracles</td>
</tr>
<tr>
<td>-Source Corossol</td>
</tr>
<tr>
<td>-Marche de Kenscoff</td>
</tr>
<tr>
<td>-Gerit</td>
</tr>
<tr>
<td>-Lamantin 54</td>
</tr>
</tbody>
</table>
A total of 258 packs of antimicrobials containing 21 generic medicine names labelled on the package were bought and 196 packs including 11 antimicrobials were analysed.

<table>
<thead>
<tr>
<th>Generic name</th>
<th>Number of packs</th>
<th>Number of pills</th>
<th>Price range for a pack in US$*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>58</td>
<td>290</td>
<td>0.5 – 0.76</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>42</td>
<td>210</td>
<td>0.5 – 1.51</td>
</tr>
<tr>
<td>Cotrimoxazole</td>
<td>28</td>
<td>140</td>
<td>0.5 – 6.97</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>21</td>
<td>105</td>
<td>0.5 – 0.61</td>
</tr>
<tr>
<td>Chloroquine</td>
<td>16</td>
<td>80</td>
<td>0.5 – 1.00</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>16</td>
<td>80</td>
<td>0.5 – 2.78</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>7</td>
<td>35</td>
<td>0.76 – 1.82</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>3</td>
<td>10</td>
<td>0.5 – 0.76</td>
</tr>
<tr>
<td>Cloxacillin</td>
<td>3</td>
<td>15</td>
<td>1.26 – 1.7</td>
</tr>
<tr>
<td>Amoxicillin / Clavulanic Acid</td>
<td>1</td>
<td>5</td>
<td>1.00</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>1</td>
<td>5</td>
<td>4.04</td>
</tr>
</tbody>
</table>
Results

- Origin Countries (presumed) of the antimicrobials
  - India (75%), China (7%), Kenya (5%), USA (5%), Haiti, France, Canada, Honduras, Unknown
Table 2. Description of the spectral match quality (“Good” or “Poor”) of the analyzed sample of antimicrobials acquired in different street markets in Port-au-Prince (Haiti). The different medicines have been categorized according to the AWaRe classification (see Methods).

<table>
<thead>
<tr>
<th>AWaRe Classification</th>
<th>Generic Name</th>
<th>Good Match</th>
<th>Poor Match</th>
<th>Total Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Access</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>286 (98.6)</td>
<td>4 (1.4)</td>
<td></td>
<td>290 (100)</td>
</tr>
<tr>
<td>Amoxicillin/Clavulanic Acid</td>
<td>-</td>
<td>5 (100)</td>
<td></td>
<td>5 (100)</td>
</tr>
<tr>
<td>Cloxacillin</td>
<td>-</td>
<td>15 (100)</td>
<td></td>
<td>15 (100)</td>
</tr>
<tr>
<td>Cotrimoxazole</td>
<td>140 (100)</td>
<td>-</td>
<td></td>
<td>140 (100)</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>210 (100)</td>
<td>-</td>
<td></td>
<td>210 (100)</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>-</td>
<td>105 (100)</td>
<td></td>
<td>105 (100)</td>
</tr>
<tr>
<td>Subtotal Access</td>
<td>636 (83.1)</td>
<td>129 (16.9)</td>
<td></td>
<td>765 (100)</td>
</tr>
<tr>
<td>Watch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azithromycin</td>
<td>-</td>
<td>10 (100)</td>
<td></td>
<td>10 (100)</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>50 (62.5)</td>
<td>30 (37.5)</td>
<td></td>
<td>80 (100)</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>-</td>
<td>5 (100)</td>
<td></td>
<td>5 (100)</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>-</td>
<td>35 (100)</td>
<td></td>
<td>35 (100)</td>
</tr>
<tr>
<td>Subtotal Watch</td>
<td>50 (38.4)</td>
<td>80 (61.5)</td>
<td></td>
<td>130 (100)</td>
</tr>
<tr>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloroquine</td>
<td>71 (88.8)</td>
<td>9 (11.3)</td>
<td></td>
<td>80 (100)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>757 (77.6)</td>
<td>218 (22.4)</td>
<td></td>
<td>975 (100)</td>
</tr>
</tbody>
</table>
Results

![Ranking of the antimicrobials by proportion of poor quality](image-url)

- Tetracycline
- Erythromycin
- Cloxacillin
- Clarithromycin
- Azithromycin
- Amox_clav
- Ciprofloxacin
- Chloroquine
- Amoxicillin
- Metronidazole
- Cotrimoxazole

Proportion of poor match
Discussion / Conclusions

• Antimicrobials could be freely obtained without a prescription in Haiti and are available in street markets

• To our knowledge, this is the first study approaching the free sales of antimicrobials in Haiti using this technique
  • new technology using a non-destructive and accurate approach to the detection of counterfeit pharmaceutical products
  • Can be extended to other types of drugs and new environments

• Limitations
  • Sampling process
  • HQI limits (the quality of the active ingredient, compounds present in counterfeit medicines, etc)

• Conclusions
  • Potential contributions of this problem in the actual Antimicrobial Resistance
  • Serious needs to Improve measurements on appropriate Use of Antimicrobials in Haiti
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References


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Questions and Answers

SIGN 4 - Medicines use and quality

Post your question via Q&A box

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Thank you for your attention