

International Pharmaceutical Federation (FIP):

# FIP reference paper on the effective utilization of pharmacists in improving maternal, newborn and child health (MNCH)

## Table of contents

Acknowledgements.....	3
Introduction: maternal, newborn and child health in the Global environment .....	4
I) Maternal health.....	4
II) Child health .....	5
III) Intergovernmental initiatives for Maternal, Newborn and Child Health .....	6
Methods used for this reference document.....	9
I) Scope and structure of the reference document .....	9
II) Evidence used for this document.....	10
Maternal Health .....	11
Role 1: Prepare, obtain, store, secure, distribute, administer, dispense and dispose of medical products.....	11
1) Prepare extemporaneous medicine preparations and medical products .....	11
2) Obtain, store, and secure medicine preparations and medical products.....	11
3) Distribute medicine preparations and medical products.....	12
4) Administration of medicines, vaccines and other injectable medications .....	14
5) Dispensing of medical products .....	15
6) Dispose of medicine preparations and medical products.....	15
Role 2: Provide effective medication therapy management .....	15
1) Assess patient health status and needs .....	16
2) Manage patient medication therapy.....	18
3) Monitor patient progress and outcomes .....	21
4) Provide information about medicines and health related issues .....	21
Role 3 - Maintain and improve professional performance .....	25
1) Plan and implement continuing professional development strategies to improve current and futures performance.....	25
Role 4 - Contribute to improve effectiveness of the health care system and public health .....	26
1) Disseminate evaluated health information about medicines and various aspects of self-care .	26
2) Engage in preventive care activities and services .....	27
3) Comply with national professional obligations, guidelines and legislations .....	28
4) Advocate and support national policies that promote improved maternal health outcomes...	29

Newborn and Child Health.....	30
Role 1: Prepare, obtain, store, secure, distribute, administer, dispense and dispose of medical products.....	30
1) Prepare extemporaneous medicine preparations and medical products .....	30
2) Obtain, store and secure medicine preparations and medical products.....	31
3) Distribute medicine preparations and medical products.....	32
4) Administration of medicines, vaccines and other injectable medications .....	32
5) Dispensing of medical products .....	33
6) Dispose of medicine preparations and medical products.....	34
Role 2: Provide effective medication therapy management .....	34
1) Assess patients' health status and needs.....	35
2) Manage patient medication therapy.....	35
3) Monitor patient progress and outcomes .....	39
4) Provide patient information about medicines and health-related issues .....	41
Role 3 - Maintain and improve professional performance .....	43
1) Plan and implement continuing professional development strategies to improve current and future performance .....	43
Role 4 - Contribute to improve effectiveness of the health care system and public health .....	43
1) Disseminate evaluated information about medicines and various aspects of self -care .....	43
2) Engage in preventive care activities and services .....	44
3) Comply with national professional obligations, guidelines and legislations .....	45
4) Advocate and support national policies that promote improved health outcomes .....	45
Conclusions .....	47
References.....	49
Appendix 1: Examples of activities run by pharmacists' organisations.....	75
I) Project for Medicine education (Finland) .....	75
II) Rational use of medicines – lectures in Elementary and High schools (Japan) .....	76
III) Boat Clinic implemented by C-NES in partnership with NRHM, Assam (India) .....	77
IV) Child-to-child Health Programme (India).....	79
V) Collective Prescribing in Quebec (Canada) .....	80
VI) Plenufar 4 - Improving pregnant women and mothers' nutrition (Spain) .....	81
VII) Plenufar 2 - Improving children's food habits (Spain) .....	83
VIII) Attention Deficit Hyperactivity Disorder (Seville, Spain).....	85
IX) Pharmaceutical Care for Pregnant Women and Children (Nigeria).....	86
Appendix 2: Extract of the FIP/WHO Guidelines on Good Pharmacy Practice: Standard for Quality of Pharmacy Services .....	88

## ACKNOWLEDGEMENTS

This Reference document was developed in 2010 by the FIP working group on the effective utilization of pharmacists in improving maternal, newborn and child health (MNCH).

This group was set by the FIP Bureau and its members were:

- Dr Régis Vaillancourt, Canada (Chairman of the working group)
- Luc Besançon, the Netherlands (Member)
- Bisi Bright, Nigeria (Member)
- Avanthi Govender Bester, South Africa (Member)
- Dr Rebekah Moles, Australia (Member)
- Dr Antonio M. Rabasco Alvarez, Spain (Member)
- Praful D. Sheth, India (Member)

This document benefited from the review of the following consulting members:

- Daniel Bar-Shalom, Denmark (Consulting member)
- Andy Gray, South Africa (Consulting member)
- Rita Jew, USA (Consulting member).

The Working group also benefited from the contributions of the following individuals:

- Jean-Christy Cameron, Canada
- Tomowo Faduyile, Nigeria
- Dr Maria Luisa González Rodríguez, Spain
- Aliya Kassamali, Canada
- Kapil M. Khambolja, India
- Ahmed Khan, India
- Olugbenga O. Odunfa, Nigeria
- Dr Antonio Ramos Carrillo, Spain

FIP would like to thank all the contributors for sharing their expertise and for helping to develop this reference document.

## INTRODUCTION: MATERNAL, NEWBORN AND CHILD HEALTH IN THE GLOBAL ENVIRONMENT

### I) Maternal health

Maternal health refers to the health of women pre-pregnancy, during pregnancy, childbirth and postpartum<sup>1</sup>. It is an all-encompassing term that includes both the clinical and social aspects of health care. Pre-pregnancy care aims to reduce risk factors that might affect future pregnancies. This is accomplished through initiatives involving patient education, health promotion, screening and interventions for women of reproductive age. Pregnancy care refers to a broad range of health services a woman receives between the timeframe of conception and delivery.

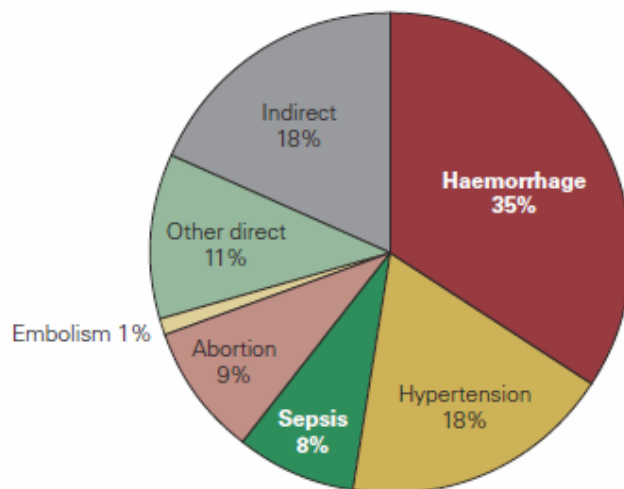
Postnatal care involves recovery from childbirth, breastfeeding and the health status of the neonate.<sup>1</sup> The ultimate goal of maternal health care is to have a safe and successful pregnancy. Unfortunately, there are many women that have pregnancy related complications, often resulting in death of mothers.<sup>2</sup>

Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy (still birth, abortion or term delivery), regardless of the site or duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management.

It has been estimated that in 2008, there were 342 900 (uncertainty interval 302 100-394 300) maternal deaths worldwide. These figures are lower than the 526 300 (uncertainty interval 446 400-629 600) estimated in 1980.<sup>3</sup> According to a publication from the World Health Organization and UNICEF,<sup>4</sup> the causes of maternal death can be attributed to seven different factors at a global level:

- Severe bleeding (haemorrhage): 35%
- Hypertension: 18%
- Sepsis: 8%
- Abortion: 9%
- Embolism: 1%
- Other direct causes: 11%
- Indirect causes (e.g., malaria, anaemia, HIV/AIDS, cardiovascular disease, etc.): 18%

Global estimates of the causes of maternal deaths, 1997–2007



**Figure 1 - Global estimates of the causes of maternal deaths, 1997-2007**  
 From Countdown to 2015: taking stock of maternal, newborn & child survival -  
 Decade Report (2000-2010)<sup>4</sup>

Regional estimates show that haemorrhage and hypertension are among the top three causes of deaths in both South Asia and Sub-Saharan Africa, where the majority of maternal deaths occur.<sup>4</sup>

## II) Child health

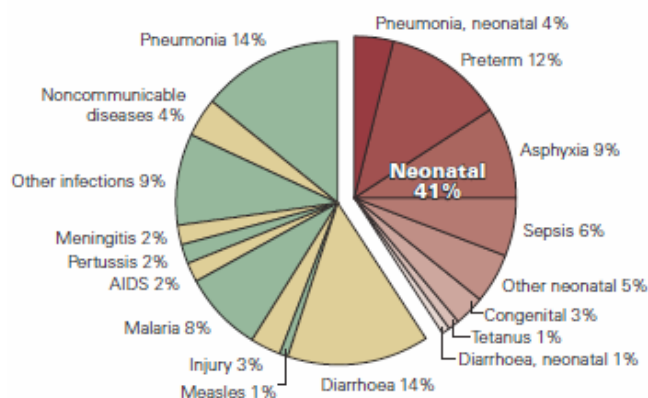
Child health generally encompasses the physical, mental, emotional, and social well-being of children from infancy through adolescence, however, depending on the definition, child health can be limited up to age 5.

Globally 8.8 million children die before their fifth birthday.<sup>4</sup> Worldwide mortality in children younger than 5 years has dropped from 11.9 million in 1990 to 7.7 million deaths in 2010.<sup>5</sup> Thirty three percent of deaths of children younger than 5 years occurs in Asia and 49.6% in sub-Saharan Africa.<sup>5</sup>

The mortality rate also varies according to the age of the child: 40% of child death occurs in the neonatal period (1<sup>st</sup> month). In Africa, this rate is 29% whereas in South East Asia, over 54% of childhood death occurs during the neonatal period.<sup>4</sup>

The major causes of child deaths are pneumonia and diarrhoea, while under nutrition contributes to one-third of child deaths.<sup>4</sup>

Global causes of death among children ages 0–59 months, 2008



Undernutrition contributes to one-third of child deaths.

**Figure 2 - Global causes of death among children ages 0-59 months, 2008**  
From *Countdown to 2015: taking stock of maternal, newborn & child survival – Decade Report (2000-2010)*<sup>4</sup>

### III) Intergovernmental initiatives for Maternal, Newborn and Child Health

In 2000, the United Nations (UN) organised the UN Millennium Summit which gathered representatives from member states and from many international organisations. At the summit, 189 countries, including 147 heads of State and Government agreed upon the adoption of the United Nations Millennium Declaration.<sup>6,7</sup> From the eight chapters of this Declaration, the Millennium Development Goals (MDGs) were developed. The MDGs consist of eight goals with 21 targets, with a series of measurable indicators defined for each target. It is anticipated that these goals will be met by 2015. Two goals (4 and 5) and three targets, were specifically directed towards Maternal, New Born and ChildHealth:<sup>7</sup>

#### **Goal 4: Reduce Child Mortality:**

- Target 4A: Reduce by two thirds, between 1990 and 2015, the under-five mortality rate.

Indicators:

- 4.1 Under-five mortality rate
- 4.2 Infant mortality rate
- 4.3 Proportion of 1 year-old children immunized against measles

#### **Goal 5: Improve Maternal Health:**

- Target 5A: Reduce by three quarters the maternal mortality ratio

Indicators:

- 5.1 Maternal mortality ratio
- 5.2 Proportion of births attended by skilled health personnel

- Target 5B: Achieve by 2015, universal access to reproductive health

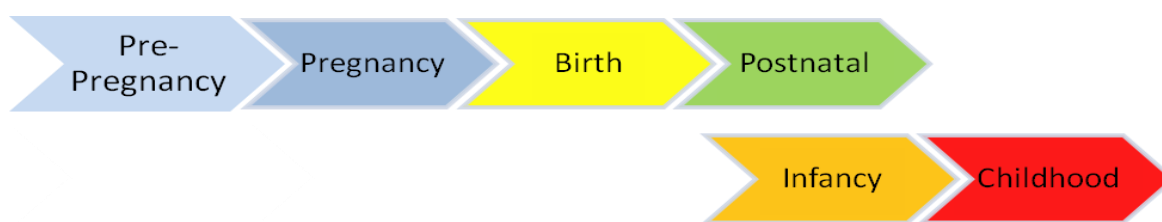
Indicators:

- 5.3 Contraceptive prevalence rate
- 5.4 Adolescent birth rate

5.5 Antenatal care coverage  
5.6 Unmet need for family planning

Every year approximately eight million children die of preventable causes and more than 350,000 women die from preventable complications related to pregnancy and childbirth. Reaching the targets for MDG 4 (a 2/3rd reduction in under five mortality) and MDG 5 (a 3/4th reduction in maternal mortality and universal access to reproductive health) would mean saving the lives of four million children and about 190,000 women in 2015 alone.<sup>8</sup>

In order to reach these goals, a Global Strategy for Women’s and Children’s Health<sup>8</sup> was developed by the United Nations. To support countries to translate this strategy into policy and practice, the World Health Organization selected a set of interventions across the continuum of care, from pre-pregnancy stages up to childhood for the top-priority countries:<sup>4</sup>



Stage	Countdown interventions and approaches
Pre-Pregnancy	Contraceptive prevalence rate
Pregnancy	<ul style="list-style-type: none"> <li>- At least four antenatal care visits</li> <li>- Prevention of mother-to-child transmission</li> <li>- Intermittent preventive treatment of malaria for pregnant women</li> <li>- Neonatal tetanus protection</li> </ul>
Birth	- Skilled attendant at birth
Postnatal	<ul style="list-style-type: none"> <li>- Postnatal visit for mother</li> <li>- Early initiation of breastfeeding</li> </ul>
Infancy	<ul style="list-style-type: none"> <li>- Exclusive breastfeeding (less than age 6 months)</li> <li>- Complementary breastfeeding (age 6-9 months)</li> <li>- Measles immunization</li> <li>- DPT3 immunization</li> <li>- Vitamin A supplementation (two doses)</li> </ul>
Childhood	<ul style="list-style-type: none"> <li>- Children sleeping under insecticide-treated nets</li> <li>- Care seeking for pneumonia</li> <li>- Antibiotics for pneumonia</li> <li>- Malaria treatment</li> <li>- Diarrhoea treatment</li> <li>- Improved sanitation facilities</li> <li>- Improved drinking water</li> </ul>

**Table 1 – Set of interventions across the continuum of care, from pre-pregnancy stages up to childhood selected by WHO for the top-priority countries**

*Adapted from Countdown to 2015: taking stock of maternal, newborn & child survival – Decade Report (2000-2010)<sup>4</sup>*

Pharmacists play a role in facilitating or providing products and services which address these priorities. In support of the above, evidence of the contribution of pharmacists in improving Maternal, Newborn and Child Health have been gathered into this report. The main objective of this report is to describe the current role that pharmacists play in support to maternal and child health.



## METHODS USED FOR THIS REFERENCE DOCUMENT

### **I) Scope and structure of the reference document**

As any other patient, children and (future) mothers benefit from the services provided by pharmacists. Some of these services are not specific (or related) to pregnancy, delivery post-natal care or childhood. Such activities have been detailed in several key references, including:

- the joint FIP/WHO Guidelines on Good Pharmacy Practice: Standard for Quality of Pharmacy Services;<sup>9</sup> see Appendix 2 for an extract of this document;
- the joint FIP/WHO publication: “Developing Pharmacy Practice, a focus on patient care”,<sup>10</sup>
- the FIP Basel Statements on the future of hospital pharmacy.<sup>11</sup>

However, some conditions related to (or particularly worsening during) pregnancy, delivery and post-natal period or in childhood, require specific care and services from pharmacists, wherever they practice. This document focuses on these specific activities, however one should keep in mind that the services described later are to be considered as an addendum (or a adaptation) of the services offered to the general public.

One should also realise that the aim of this document is NOT to list what pharmacists should be doing or what is needed to run specific activities, but what they are actually doing, either as part of a standard practice in many countries or through advanced practice in only a few settings / countries.

The specific roles, functions and activities identified as improving maternal, newborn and child health have been structured in accordance with the FIP/WHO Guidelines on Good Pharmacy Practice: Standard for Quality of Pharmacy Services. They have been gathered into four main roles where pharmacists’ involvement or supervision is expected by society and the individuals they serve:

1. Prepare, obtain, store, secure, distribute, administer and dispose of medical products.
2. Provide effective medication therapy management.
3. Maintain and improve professional performance.
4. Contribute to improve effectiveness of the health-care system and public health.

One should keep in mind that these roles may vary for each individual pharmacist depending on their practice responsibilities and on national scope of practice for pharmacists.

Moreover, specific standards of practice (Good Pharmacy Practice) can be developed only within a national pharmacy professional organisation framework.

## **II) Evidence used for this document**

Whenever it was possible, the working group chose published and peer-reviewed evidence highlighting pharmacists' activities and their impact in improving maternal, newborn and children's health. However, many activities have yet to be published. Evidence from any other publications has also been collected.

Therefore, this document includes evidence from the following sources of information:

- Articles and other publications in peer-reviewed journals
- Reports and other publications (website, standards, statements...) from:
  - a. International organisations
  - b. National governments
  - c. Pharmaceutical associations
- Newspaper articles

In order to keep this Reference document as concise as possible, a comprehensive description of the activities listed is only available for a few activities, mainly under Appendix 1: Examples of activities run by pharmacists' organisations.

For all the other activities, this description can be obtained by consulting the references listed in the document.

Similarly, for each activity, one can refer to the references for more information on the outcomes or impact, whether they are quantified (health-related, economic or humanistic) or qualitative.

## **MATERNAL HEALTH**

### **Role 1: Prepare, obtain, store, secure, distribute, administer, dispense and dispose of medical products**

Access to necessary medications is fundamental to the healthcare process. Within maternal health, access to nutritional supplementation, contraception and medications is essential.

#### **1) Prepare extemporaneous medicine preparations and medical products**

When medications are not commercially available it is often possible for a pharmacist to prepare the medication extemporaneously. Pharmaceutical compounding allows individualised drug therapy for patients.<sup>12</sup>

Most pharmacists working in hospitals with clean room facilities are involved in the provision of sterile products that are generally not available from commercial suppliers. The range and complexity of products will vary depending on the type and level of clinical services provided by the hospital. Some may offer an IV additive service while others will provide specialized products such as individualised total parenteral nutrition solutions for women.<sup>13</sup>

Pharmaceutical compounding includes medications used in maternal health. During breastfeeding, mothers may experience sore and potentially infected nipples; there are several preparations that pharmacists in the community compound that are effective for treatment of these complaints, such as specially formulated nipple ointments.<sup>14,15</sup>

Pharmaceutical compounding also offers diverse alternatives to commercially available products.<sup>12</sup> In some cases, such as for the 17 alpha-hydroxyprogesterone caproate (a product to reduce the risk of preterm births), compounding activities may lead to increased access through lower price (\$300 for the compounding product vs. \$29,000 for the manufactured product).<sup>16</sup>

Finally, in both the hospital and community settings, pharmacists ensure that there are no deficiencies affecting quality, purity or potency of medicinal products they produce.<sup>17-19</sup> In this way, pharmacists protect the safety of mothers receiving extemporaneously compounded products.

#### **2) Obtain, store, and secure medicine preparations and medical products**

There are a number of medications used to manage maternal health issues such as family planning and contraception, pregnancy, the post-partum period and breastfeeding. Pharmacists worldwide ensure adequate inventory and stock management to provide the products necessary to meet the needs of mothers.

By stocking contraceptive items, pharmacists are able to meet the contraceptive and family planning needs of women and couples.<sup>20</sup>

Pharmacists also ensure pregnant women receive appropriate drug therapy through their involvement in formulary management. Formulary management helps to ensure that the required medications are available to meet the healthcare needs of patients. Many pharmacists work in medical insurance structures, in national and provincial head offices, in stand-alone selection bodies (e.g. the British National Institute for Health and Clinical Excellence (NICE) or the Australian Therapeutics Guidelines group), which are often the leading organisations for the development of formularies. The developed formulary is often based on the WHO Lists of Essential Medications for both adults and children,<sup>21</sup> established by the Expert Committee on the Selection and Use of Essential Medicines where many members are pharmacists.<sup>21</sup> Pharmacists' contributions to developing and managing formularies is recognised,<sup>22</sup> as in many hospitals they are the secretary of the Drug and Therapeutics Committee.<sup>23</sup> Pharmacists evaluate the need to include new medicines<sup>23</sup> and ensure that formularies include essential medications. Formulary management activities aim to improve the availability, accessibility and the rational use of medicines,<sup>24</sup> and are therefore a benefit to maternal health as the medications mothers require are available at the time they are needed. Hospital pharmacists facilitate or make decisions regarding the rapid accessibility of critical medications in hospital labour and delivery units.<sup>25</sup>

In order to reduce the prevalence of bleeding (postpartum haemorrhage) at home births in Nepal, pharmacies are involved in a joint programme with local communities, for the provision of misoprostol to pregnant women, associated with a reduction of almost 50% of deaths related to delivery.<sup>26</sup>

Pharmacists also evaluate the use and need for medications when implementing specific clinical guidelines. One area where this is specifically important is the prevention of HIV mother-to-child transmission. This includes securing the necessary medications through appropriate stock management.<sup>27,28</sup> Pharmacists assist in the selection, creation and dispensing of medicine packs/kits for the reduction of HIV transmission from pregnant mothers to babies.<sup>29</sup> In many countries, pharmacists also obtain, store, and dispense appropriate therapy combinations. By stocking these medications, pharmacists provide access to the necessary medications and promote healthy deliveries among pregnant HIV positive mothers. They also reduce the risk of mother-to-child HIV transmission and promote the survival of HIV-exposed babies.<sup>30</sup>

### **3) Distribute medicine preparations and medical products**

Pharmacists are a key player in the distribution of reproductive health products. In 1990, it was estimated that at the global level, 55 million married couples of reproductive age purchased their contraceptives in pharmacies. This amounts to approximately one-fifth of couples using family planning and 54 per cent of couples using the contraceptive methods most widely sold in pharmacies. These contraceptive methods include condoms, oral contraceptives, injectable contraceptives, diaphragms, and spermicides.<sup>31</sup> Worldwide, contraceptive prevalence has increased from 54% in 1990 to 63% in 2000. In the developing regions, contraceptive prevalence increased rapidly in Africa, Latin America and the Caribbean (by more than 1.0 percentage point per year, on average). The high contraceptive prevalence achieved by the majority of the Latin American and Caribbean countries is

the result of a situation where family planning services are widely available through a mix of private and public services, including pharmacies, all of which supply contraceptives to large numbers of users. To a large extent, high contraceptive prevalence in many Latin American countries is possible because women can buy contraceptive supplies in pharmacies.<sup>32</sup> Similarly, a survey in 1999 showed that 60% of women in Karachi, Pakistan who used either oral contraceptives or condoms obtained them from a pharmacy.<sup>33</sup> Pharmacies ensure access and availability of over-the-counter contraceptive means, such as condoms.<sup>20</sup>

In all South African government health facilities (i.e. hospitals) pharmacists dispense dual contraception methods to patients. This includes methods such as the use of a condom plus a contraception method (such as oral contraceptives).<sup>30</sup> Through these activities, pharmacists increase access to contraception among women who wish it.

Pharmacists stock and distribute emergency contraception, either over the counter or by prescription.<sup>34</sup> The ability of pharmacists to dispense emergency contraception increases the number of women that receive this medication within 24 hours.<sup>35</sup> Pharmacies offer advantages of location, convenience and hours of operation. Availability of emergency contraception from pharmacies increases timely access of this medication for women.<sup>36-39</sup> For instance, in Spain, when the product becomes a Pharmacy-Only medicine (i.e. no need for a prescription) which can be dispensed to girls under 16 without parental consent, the accessibility of the emergency contraception rose and over 600 000 units are now dispensed annually (increase of around 160%).<sup>40</sup>

When emergency contraception is available through pharmacies the use of the medication increases compared to when it is available only through other outlets, such as physician clinics or hospitals. Increased access to emergency contraception through pharmacies does not have a negative impact on the use of other forms of contraception.<sup>41</sup>

Emergency contraception has higher efficacy when taken earlier, thus increased access from pharmacies may improve the effectiveness of this medication because women are taking it sooner.<sup>35</sup> Research carried out in 2003 in United Kingdom found that the median time by young women aged 13 to 20 years to obtain EHC from pharmacy was 16 hours, much less than the median time to obtain the same service from family planning clinics (41 hours), and represents a potential reduction of 10% of unintended pregnancies.<sup>42</sup> Similar studies have also reported a reduction in the number of unintended pregnancies.<sup>43,44</sup> One study demonstrated a reduction of 3.1% (95% confidence interval (CI)=1.1%, 5.3%) in unintended pregnancies for women obtaining emergency contraception from a pharmacy compared to those that did not,<sup>37</sup> while data from Quebec, Canada<sup>45</sup> highlight that making emergency contraception available at community pharmacies without a medical prescription contributes to a substantial decrease in abortions (12%).

One study demonstrated that increased visual accessibility of emergency contraception in pharmacy windows increased the number of enquiries from patients about this medication.<sup>46</sup> The same study found that the amount of emergency contraception dispensed also increased with increased visual accessibility of this product, as did the number of pregnancy tests sold.<sup>46</sup>

In addition to playing an important role in preventing unwanted pregnancies, pharmacists may help facilitate a healthy pregnancy. A key area where this can be done is by ensuring expecting

mothers maintain adequate nutrition during pregnancy. Pharmacists address this need by increasing access to nutritional supplementation, including vitamin and nutrient supplements.<sup>47,48</sup> Pharmacists supply patients with necessary vitamins and supplements to ensure safety of the mother and foetus during pregnancy. Providing both safe and efficacious products can have significant outcomes not only for the mother but also for the developing fetus.<sup>49</sup> For example, pharmacists have been involved in the distribution of folic acid to pregnant women.<sup>47</sup> Ensuring expecting mothers receive appropriate folic acid supplementation within the first 6 weeks of pregnancy substantially reduces the risk of neural tube defects.<sup>50</sup>

Upon delivery, pharmacists recommend or provide certain products and devices to breastfeeding mothers, such as nipple care preparations and breast pumps.<sup>51</sup>

#### **4) Administration of medicines, vaccines and other injectable medications**

Pharmacists are one of the most accessible health-care providers, which positions them to support public health initiatives in the community. This includes the promotion of immunization especially for pregnant woman like during the H1N1 outbreak<sup>52</sup> or the administration of vaccines by pharmacists specially trained for this<sup>53-55</sup> or through a nurse present in the community pharmacy administering vaccines.<sup>56</sup>

Pregnant women may be at increased risk of adverse outcomes if infected with the influenza virus. In the United States, the use of standing orders to allow pharmacists to administer vaccinations has improved access and uptake of influenza vaccinations among pregnant women.<sup>57,58</sup> In Canada, pharmacists are also allowed to administer H1N1 vaccine to pregnant women.<sup>54,55</sup>

Some pharmacies have also been involved in the provision of Human Papilloma Virus Vaccine in Wales<sup>59</sup> or in Portugal.<sup>60</sup>

Moreover, pharmacists guarantee the proper transport and storage of products subject to the cold chain management, until their administration.<sup>54,61</sup> Therefore, they ensure the effectiveness and the safety of vaccines administered to mothers.

Not only can pharmacists administer some vaccines, but they may also administer subcutaneous depot medroxyprogesterone acetate (DMPA-SC) such as in a study in North Carolina (United States). Continuation rates and patient satisfaction with DMPA-SC given in the pharmacy setting were comparable to those who received DMPA-SC in a family planning clinic.<sup>62</sup> Similarly, through social franchising, DMPA-SC was made available through community pharmacies in Nepal and its administration was made by trained and certified service providers.<sup>63</sup>

## **5) Dispensing of medical products**

Pharmacists increase access to contraceptives through use of collaborative practice supported by appropriate regulations.<sup>64</sup> Pharmacists are also allowed in some countries, to provide oral contraceptives when a prescription is expired, in the interest of treatment continuity.<sup>65</sup>

Not only do pharmacists provide contraceptive medicines and devices, but they play a role in advising individuals about contraceptive options including those that do not require a prescription, such as male or female condoms. These can represent the second most used popular contraceptive method.<sup>36,66</sup>

Pharmacists also prevent and treat the transmission of tuberculosis (TB). The potential role of pharmacists in prevention and treatment of TB has been recognised in providing supervision, educational information and support to patients living in the community, thereby enhancing treatment success, reducing errors and contributing to cutting disease transmission. The ongoing TB fact card project in India<sup>67</sup> includes pharmacists as distributors of TB information, referrals for diagnosis, providing Directly Observed Treatment Short course (DOTS) medicine boxes, administration of treatment and following up on patient by phone call. Patients and pharmacists alike are responding with satisfaction including mothers and children. The project is ongoing and will take some time before determining the exact number of children and mothers being supported by pharmacists.

## **6) Dispose of medicine preparations and medical products**

Pharmacists are available to guide the public on the proper disposal of medications. This is an important role because it helps to prevent the use of expired or unsafe medications.<sup>68</sup> For mothers it is important to dispose of unwanted and expired medications as these products may pose a risk of accidental ingestion by children.

Community pharmacists offer programmes commonly referred to as *brown bag medication reviews*. During these reviews, patients bring unwanted, expired, or other medications to the pharmacy, where they can be properly reviewed and disposed of if appropriate and according to national standards.<sup>69</sup> This provides benefits to the patient in terms of lowering prescribing costs through reduced waste.<sup>69</sup> Disposing of unwanted and expired medications also promotes patient safety by avoiding inappropriate use of the medications, especially for pregnant women.

Proper disposal of medications through community pharmacies decreases the impact that these medications may have on the environment.<sup>70,71</sup>

## **Role 2: Provide effective medication therapy management**

One of the main roles of pharmacists is to provide effective medication therapy management. There are a number of different functions within this role, each of which contributes to the provision of care within maternal health. Initially, pharmacists assess patient health status and needs. Through

this process pharmacists identify the needs of individualised patients to optimise care for each patient. Following the assessment, pharmacists manage patients' medication therapy. This includes a number of activities that promote safe and effective use of medicines among women.

Pharmacists also monitor patient progress and outcomes. This follow-up and monitoring is an essential component of care because it ensures that women continue to have their health needs addressed throughout all stages of their motherhood. Throughout the effective medication therapy management process, pharmacists in all areas of practice provide patient education. This education is key in promoting health among women and increases empowerment among patients so they become active participants in managing their health. Through these various functions, pharmacists are able to effectively provide care to women and address all their maternal health needs.

## **1) Assess patient health status and needs**

### **a) Family Planning/Contraception**

Pharmacists are able to assess patients' needs in order to recommend an appropriate form of contraception and offer advice on family planning topics, including the use of fertility monitors and pregnancy tests. Based on thorough assessments, they provide the necessary information to help couples choose the most appropriate form of contraception from the available methods and refer patients to physicians when necessary.<sup>72</sup> Increased collaboration between pharmacists, the health care team and advocacy groups helps achieve the common goal of improved access to reproductive health services.<sup>73</sup>

It was demonstrated that when contraception is given to patients, a vast majority of French community pharmacists (74.5%) discuss tobacco use.<sup>74</sup>

Chlamydia infections during pregnancy may lead to increased risk of certain conditions, such as ectopic pregnancy, as shown in a study from Sweden which examined the correlation of the two.<sup>75</sup> In some countries, such as Australia and the United Kingdom,<sup>76</sup> community pharmacists participate in Chlamydia screening programs. Pharmacists identify individuals who have not been tested for Chlamydia and offer a testing kit. Patients are referred to a physician if they have undiagnosed symptoms of a sexually transmitted infection. This provides a screening service that is offered to the general population and captures women that may not have otherwise been screened.<sup>77</sup> By providing Chlamydia screening programs in the community, pharmacists increase the availability and use of these tests. Reducing the incidence of Chlamydia in turn helps to prevent complications of pregnancy, such as ectopic pregnancy.

### **b) Pregnancy**

Pregnancy is a time when a dialogue is established between women and their pharmacists. During this period, pharmacists assess health status and relevant social issues among pregnant women. A substantial proportion of maternal deaths – perhaps as many as one in four at global level – occur during pregnancy,<sup>78</sup> therefore, pharmacists help determine and mitigate risk factors among this population. Diseases and other health problems can often complicate, or become more severe during



pregnancy. Malaria together with anaemia is responsible for 10 000 maternal deaths and 200 000 infant deaths per year.<sup>79</sup>

Pharmacists are able to counsel women before pregnancy to discuss the risks associated with specific therapeutic agents, traditional medicines and abuse of substances such as nicotine and alcohol.<sup>80,81</sup> Pharmacists are knowledgeable of the impact these substances may have during pregnancy and are able to quantify the risks for women and provide ways to mitigate these risks.

A survey in France revealed that pregnant women ask for more information from pharmacists than any other patients, particularly when it comes to continuing medication started before pregnancy. Of those pharmacists surveyed, 80% responded that they would be eager to take on more responsibilities in counselling patients and preventing teratogenic risks.<sup>82</sup>

During pregnancy, women may be susceptible to comorbid conditions, such as gestational diabetes mellitus, depression, eclampsia and anaemia. Pharmacists help assess patients to determine any interventions that are needed. Depression and diabetes screening are integrated into pharmacist-based prenatal care as part of a program in Little Rock (United States); this ensures that patients receive the attention and care necessary to better manage their illnesses.<sup>83</sup> In the United States, pharmacists also assess the risk of gestational diabetes mellitus in pregnant women in order to prevent complications and to manage the condition appropriately.<sup>84</sup>

Pharmacists in the United Kingdom take part in weight management programs targeting women with a BMI of 30 or more, either before or after pregnancy.<sup>85</sup> Pharmacists identify these women and offer structured weight loss programs.<sup>85</sup> Through early identification and assessment, pharmacists are able to initiate programs to support these women to meet their weight loss goals.

Pharmacists can identify women at risk of depression during pregnancy and can refer them to the appropriate healthcare professionals.<sup>83</sup>

### **c) Delivery/Post Partum**

During the delivery and post-partum periods, pharmacists play a role in assessment of maternal health status. They offer alternatives through the provision of pharmaceutical care and solicit help from other healthcare professionals when necessary.<sup>86</sup>

Pharmacists can identify women at risk of post partum depression.<sup>87</sup> This condition can be very common – in Australia, almost 16% of post-partum women are affected.<sup>51</sup> A standardised approach has been suggested, consisting of pharmacists using the Edinburgh Postnatal Depression Scale assess women after delivery. This scale utilises a set of 10 questions designed to determine if a new mother may have depression. Following assessment, pharmacists identify women at risk, provide advice and support and refer to a general practitioner if necessary.

#### **d) Breast Feeding**

Pharmacists have a consistent approach in assessing and identifying breastfeeding women and use reliable, continuously updated resources to guide their advice about medication use in breastfeeding women.<sup>88</sup> They assess and question breastfeeding status through observation, questioning, and medication review, as well as through the sales of other products (e.g. infant formula milk). They also address issues such as alcohol use.<sup>51</sup> Pharmacists understand that the use of medications during pregnancy and breastfeeding may cause anxiety for mothers. In Japan, the extent of anxiety among mothers was found to be 79.3% during pregnancy and 71.7% during breastfeeding. By assessing patients for this anxiety, pharmacists in Japan work actively to determine and relieve any concerns mothers have.<sup>89</sup>

## **2) Manage patient medication therapy**

### **a) Family planning / contraception**

Pharmacists have the knowledge and expertise to manage specific medication needs during family planning and contraception as part of maternal health.<sup>90,91</sup> There are a number of examples that demonstrate how pharmacists are involved in these types of activities.

During family planning and when women are seeking contraception pharmacists manage emergency contraception use. Unsafe abortions account for 13% of maternal deaths according to the 2005 WHO World Health Report, making this one of the top seven causes of maternal death.<sup>92</sup> When patients obtain emergency contraception from a pharmacy instead of a physician or clinic, this leads to cost-savings for both private and public payers. One study demonstrated a US\$158 (95% confidence interval = US\$76, US\$269) reduction in costs for private payers. It also demonstrated a US\$48 (95% confidence interval = US\$16, US\$93) reduction for public payers when emergency contraception was obtained from a pharmacy.<sup>44</sup>

Pharmacists provide counselling on the use of folic acid and other nutritional supplements in planned pregnancy. By managing folic acid and vitamin supplementation during the family planning stages, pharmacists are able to promote a healthy pregnancy. Community pharmacists are in an important setting to disseminate health messages to the public, which includes the use of folic acid in planned pregnancy.<sup>90</sup> Pharmacists ensure the availability of maternal vitamin supplements (folic acid, vitamins C and D) in pharmacies and provide information regarding the safety of these supplements to pregnant women.<sup>93</sup>

Pharmacists also have a role in family planning for mothers who are HIV positive. Pharmacists review patients' CD4/Viral load history to assess efficacy of therapy during family planning and prior to conception. Pharmacists review any potential teratogenicities with the mother's current anti-retroviral drug therapy.<sup>94</sup> Addressing these topics early helps to avoid problems further on during pregnancy. Pharmacists are now considered mainstays of clinics for diseases involving complex medication regimens, such as HIV.<sup>95</sup>

## **b) Pregnancy**

Pharmacists manage specific medication needs for women who are pregnant.

They ensure their safety during medicines dispensing and prevent medicine interactions or avoid dispensing medicines unsafe for both the mother and foetus; their activity can be facilitated through computerized tools.<sup>96</sup>

Pharmacy records and maternal interviews are both indispensable sources of information on maternal medicine exposure that provide much added value during the evaluation of potential teratogenic effects of medicines.<sup>97,98</sup>

Pharmacists have extensive knowledge of medications, including the pharmacokinetics of medicines. This expertise is used to help predict the effects of medicines during pregnancy and may provide the basis for medication changes.<sup>99</sup> There are a number of specific examples of situations where pharmacists manage patient medication therapy during pregnancy.<sup>100,101</sup>

For instance, pharmacists counsel on common symptoms during pregnancy such as nausea, vomiting, heartburn and constipation. They recommend therapeutic alternatives to help relieve these symptoms in women.<sup>80</sup> These activities enable proper care for mothers in an over-burdened healthcare system where access to care is limited. In Quebec (Canada) pharmacists are able to initiate or adjust medication therapy for a group of patients through a collective prescription. The prescription is issued under the name of a physician that has agreed to the collective prescription. Pharmacists prescribe doxylamine for women experiencing nausea and vomiting associated with pregnancy. Accessibility is improved with pharmacist-prescribed doxylamine because women are not reliant on a physician visit to receive the medication. Nausea and vomiting associated with pregnancy can be debilitating for many women and timely access to effective medications from a pharmacist helps to resolve symptoms sooner (see Appendix 1: Examples of activities run by pharmacists' organisations under V) Collective Prescribing in Quebec (Canada).

Women with gestational diabetes mellitus may have complex medication regimens and more health concerns than other pregnant women. Pharmacists manage medication therapy for these patients to ensure it is safe and effective. Given the complexity of these medication regimens, pharmacists are an integral part of the healthcare team because they have the appropriate knowledge to manage this type of therapy.<sup>84</sup>

Pharmacy-based iron supplementation programs have been shown to help to prevent and treat maternal anaemia in developing countries. In Tanzania, pharmacy-supplied supplements were more accessible than those supplied from government clinics. Pharmacies were accommodating to mothers and were socially acceptable to the women.<sup>102</sup>

Pharmacists are involved in both inpatient and outpatient obstetrics and gynaecology programs. In these settings pharmacists provide pharmaceutical care and manage patient medication therapy. In Canada, of the 105 obstetrics and gynaecology outpatient programs, 7 (7%) had a pharmacist assigned for coverage. Of the 110 obstetrics and gynaecology inpatient programs in Canada, 52 (47%) had a pharmacist assigned for coverage<sup>103</sup>. These pharmacists provide support to the teams and help

manage the medications for these patients. Pharmacists provide pharmaceutical care on obstetrics and gynaecology hospital wards as part of an interdisciplinary team.<sup>104</sup>

In Africa, malaria is common in children and pregnant women. An anti-malarial utilization study in Ghana compared self-care and health facility-based malaria therapy. The self-care groups had a high level of incorrect use, as much as 95%, regarding dosage and duration of therapy. This incorrect use consequently leads to treatment failures.<sup>105</sup> Pharmacist involvement in malaria management results in better adherence to medications and addresses the high occurrence of incorrect use when medications are self-managed.

Similarly, as part of the multidisciplinary team in charge of HIV positive pregnant women, pharmacists are involved in medicine management.<sup>106</sup>

### **c) Delivery / Post Partum**

During delivery and post partum there are a number of key areas where pharmacists intervene with maternal health and manage patient medication therapy.

The role of pharmacists within obstetrics and gynaecology inpatient and outpatient programs has been discussed.<sup>103,104</sup> This role extends to management of medication therapy for mothers during delivery and post partum.

For HIV positive women, the delivery and post partum period is an important point for intervention from healthcare professionals to try to reduce the risk of transmission from mother to infant. Pharmacists provide care and support to HIV positive mothers throughout this period.<sup>95</sup> They ensure mothers and children with HIV receive appropriate treatment to prevent mother to child transmission and other complications associated with this condition.<sup>28</sup> Through involvement in the care of mothers with HIV, pharmacists increase access to healthcare providers for these patients.<sup>28</sup> Hospital pharmacists are involved in the development and implementation of guidelines on the prevention of HIV mother-to-child transmission.<sup>27</sup> One way they contribute to these efforts is by securing and managing the necessary medications.<sup>27,28</sup>

Pharmacists are an integral member of multidisciplinary teams that provide care to pregnant HIV-positive women.<sup>107-109</sup> When they take part in a multidisciplinary team providing care to HIV-positive women during pregnancy and childbirth, the mother-to-child transmission rate is low (1.7%) especially for a vaginal delivery rate of 42%.<sup>110</sup>

Pharmacists are also involved in projects that aim to improve overall medicine use. For example, they have a role in medicine use evaluation for medications used by mothers in hospitals. One study in Mater Hospital, Nairobi (Kenya) described a medicine use evaluation that was conducted for antibiotic prophylaxis in caesarean section; pharmacists played a pivotal role during this initiative by providing expertise and guidance around appropriate antibiotic use.<sup>111</sup>

#### **d) Breastfeeding**

Pharmacists manage specific medication needs and provide care for women who are breastfeeding.<sup>88,97</sup> Physicians and pharmacists work in collaboration to prevent medication use from being a barrier to breastfeeding.<sup>88</sup>

As in pregnancy, the pharmacokinetics of medicines have implications during breastfeeding. Pharmacists use their extensive knowledge of medicine pharmacokinetics to predict medicine behaviour and to help manage medications during breastfeeding.<sup>99</sup> In this way, pharmacists safeguard against adverse effects of medications and promote the optimal use of these products.

Pharmacists are aware of which medicines are contraindicated, which medicines should be used cautiously, and which medicines are the preferred alternatives during breastfeeding. Using their knowledge of the principles of medicine passage into breast milk, pharmacists minimize the infant's exposure to medicines while supporting the mother's desire to continue breastfeeding.<sup>88</sup>

### **3) Monitor patient progress and outcomes**

Within maternal health, pharmacists are involved in monitoring patient progress and outcomes. There are a number of specific examples that illustrate this role of the pharmacist.

For pregnant women with HIV, obstacles to adherence with anti-retroviral medications include intolerance to the medications (e.g. nausea), fear of harm to the foetus and competing stresses with complicated dosing schedules.<sup>112</sup> Pharmacists intervene and address these barriers through delivery of medication counselling and disease-state education.<sup>112</sup> Pharmacists monitor patients to verify adherence and address any issues to ensure patients receive appropriate therapy.

As part of inpatient and outpatient obstetrics and gynaecology teams, hospital pharmacists monitor patient progress and outcomes during pregnancy, delivery and post partum.<sup>103,104</sup> Pharmacists work on interdisciplinary teams and provide valuable pharmaceutical care for mothers at obstetrics and gynaecology clinics during pregnancy.

Pharmacists monitor mothers during breastfeeding to ensure optimal infant feeding practices are being followed.<sup>113</sup> In addition, pharmacists monitor medication therapy during breastfeeding to prevent any adverse drug reactions or events and to see that the desired outcomes are being met.<sup>114</sup>

### **4) Provide information about medicines and health related issues**

Pharmacists are involved in ensuring the safe use of medicines. As such, they educate individuals of every age, nationality and literacy level. Patients for whom medication is prescribed must understand how to take each medicine correctly (and if the medicine is intended for the mother or the child). Patient counselling and the provision of educational material in the form of patient information leaflets (PILs) by pharmacists have been shown to be effective in improving patients'

knowledge, compliance and the awareness of the potential side effects. There is also evidence that giving comprehensive information increases overall satisfaction with the care given by healthcare professionals. The prospective controlled pre-post intervention study was conducted at the outpatient department of one of the 500-bed tertiary care public hospitals in Delhi. PILs provided to the patient by the pharmacists significantly improved knowledge about medication, and improved compliance at home.<sup>115</sup>

### **a) Family planning / contraception**

Pharmacists provide patient education about family planning and contraception. They are consulted daily on numerous topics, including family planning.<sup>72</sup> Pharmacists' scope of practice allows them to engage in counselling on sexual responsibility and family planning.<sup>73,91</sup> Given the large number of people that purchase their contraceptives in pharmacies,<sup>31</sup> there are many opportunities for pharmacists to provide patient education surrounding family planning. Pharmacists promote dialogue on contraceptive alternatives<sup>34,116-119</sup> and influence the beliefs and the outcomes through effective counselling on emergency contraception.<sup>34</sup>

The dispensing of emergency contraception from pharmacies is accompanied by patient education from pharmacists,<sup>120,121</sup> who have expertise on this topic. As mentioned, unsafe abortions account for one of the seven causes of maternal death.<sup>92</sup> In the United Kingdom, the National Sexual Health Strategy promotes pharmacy-based Emergency Hormonal Contraception services. Pharmacists provide information to patients at the time of emergency contraception dispensing, which allows women to understand proper use of this medicine. Pharmacists ensure consistency of information about emergency contraception,<sup>122</sup> in particular for women less than 16 years of age.<sup>35</sup>

Adolescents experience higher oral contraception failure rates than do adult women. This is attributed to their lack of experience with contraception, higher frequency of intercourse, higher intrinsic fertility and pattern of frequent stopping or switching of methods. Adolescents also are more likely to forget to take the pill or to discontinue due to side effects, without consulting their physician. Pharmacists counsel these patients about oral contraception, through a structured approach. The quality of pharmacist-provided counselling has been shown to be a more important determinant of patient compliance with oral contraceptives than the quantity of information provided.<sup>123</sup>

### **b) Pregnancy**

Through the provision of information, pharmacists help pregnant women make informed decisions about their health and guide the choices made about management of medication therapy. There are many scenarios that illustrate pharmacists' activities within this function.

Women generally overestimate the risk of medicine use and other exposures during pregnancy; therefore, pharmacists use evidence-based information to reduce unnecessary anxiety and to ensure safe and appropriate treatment during pregnancy. Pharmacists provide the necessary counselling to women during pregnancy to ensure that misconceptions are not keeping mothers from drug therapy they may require.<sup>124</sup> A study found that pharmacists were among the top 3 most frequently used

sources of information for pregnant women.<sup>124</sup> Pharmacists are medication experts who provide patient education during pregnancy, ensuring safety and efficacy of medications. They also work with expectant mothers to relieve anxiety about medication use in pregnancy. Pharmacists provide evidence-based information that helps expectant mothers understand the risks and benefits of taking medication during pregnancy.

A major part of managing gestational diabetes mellitus includes patient education about diet, exercise, blood glucose self-monitoring, insulin self-administration and medication counselling. Pharmacists have the necessary skills and knowledge to provide this information to women with gestational diabetes mellitus and help them manage their condition.<sup>84,125</sup> Pharmacists also educate on the symptoms of hypoglycaemia and on the proper treatment for hypoglycaemic episodes.<sup>125</sup>

The barriers to adherence with anti-retroviral medications have been discussed. Pharmacists address these barriers through patient education. They provide information about how to manage them and ensure appropriate therapy.<sup>112</sup> Pharmacists also discuss pregnancy with HIV positive mothers and educate these women about the risks of transmission and the potential adverse drug reactions of antiretrovirals during pregnancy.<sup>94</sup> Pharmacists educate mothers about any potential teratogenicities with their current anti-retroviral drug therapy and relieve anxiety about taking these medications during pregnancy.<sup>94</sup>

Pharmacists are often the first point of contact for pregnant woman requesting advice on the use of vitamins and supplements. Pharmacists provide valid, evidence-based information on the effectiveness of these vitamins and supplements during pregnancy.<sup>49</sup> This eases mothers' anxiety and concerns, leading to better adherence to nutritional supplementation regimens and improved outcomes.

Not only do pharmacists counsel on pharmacological therapies, but they also are able to counsel on non-pharmacological therapies and educate pregnant mothers on the risks and benefits of specific therapies to the fetus.<sup>100,101</sup>

Pharmacists assess homeless or vulnerable mothers to evaluate their healthcare needs.<sup>126</sup> These patients may not seek medical advice from a physician, but often have contact with pharmacists in the community. In North Carolina (United States) pharmacists are able to provide the necessary written and oral information to improve the outcomes of medication use for these vulnerable populations.<sup>126</sup>

Finally, in collaboration with other healthcare professionals, pharmacists are involved in empowering future parents in the preparation and management of pregnancy and the future baby.<sup>127</sup>

### **c) Delivery / Post Partum**

Pharmacists counsel mothers who are taking post partum medications. Pharmacists at Salvation Army Grace Hospital in Ottawa (Canada) have developed and implemented a comprehensive, patient-focused, multidisciplinary system with an innovative and user-friendly approach for post partum self-



medication programs. This has been shown to benefit both patients and staff.<sup>128</sup> A second hospital in Ottawa (Canada) evaluated the implementation of a self-medication program for pain relief in obstetrics. When surveyed, 94% of mothers appreciated the self-medication program and more than 85% of mothers obtained adequate pain relief. Pharmacists help to implement these types of self-medication programs and evaluate the success of self-medication in women.<sup>129</sup>

#### **d) Breastfeeding**

Pharmacists are often the most accessible medication expert for breastfeeding women; they are able to provide accurate information on breastfeeding and the concurrent use of medications.<sup>130</sup> Pharmacists are frequently asked about medication safety when mothers pick up their prescriptions, which places pharmacists at the centre of care for these women. Almost half (45%) of pharmacists in a survey by the Rhode Island Department of Health (Providence, RI) reported getting inquiries daily or weekly from women about medication safety while breastfeeding. The majority (85%) of pharmacists in this survey reported feeling somewhat or very comfortable giving advice to breastfeeding women.<sup>130</sup>

Moreover, pharmacists share their knowledge with general practitioners (GPs) on medication and their use by breastfeeding mothers.<sup>131</sup>

#### **Use of devices:**

Many women purchase home pregnancy tests from pharmacies and benefit from counselling about proper use and concerning the results.<sup>132</sup>

Although not diagnostic, home-testing products may be used by patients for early detection of pregnancy. To minimize the possibility of false-positive and false-negative results and to ensure that patients understand how to use the products correctly, pharmacists assess the health status, and needs of the patient. Pharmacists participate in discussions and provide advice regarding these tests before patients use them.<sup>133</sup> This helps to ensure proper use of these tests and appropriate interpretation of the results.

Devices used for home evaluation of fertility, pregnancy and urinary tract and vaginal yeast infections are available in pharmacies. Pharmacists help educate patients and clinicians on their use.<sup>134</sup>



## **Role 3 - Maintain and improve professional performance**

### **1) Plan and implement continuing professional development strategies to improve current and futures performance**

As part of the competency standards described by their regulators or associations, pharmacists in some countries have specific duties regarding the management of maternal health. These standards of practice are useful tools that enable pharmacists to plan continuing education activities that will help them to maintain their competencies on maternal health.<sup>13,135</sup>

The Canadian Council on Continuing Education in Pharmacy provides a number of continuing education courses for pharmacists relevant to maternal health. Some examples include: Providing OTC Advice During Pregnancy and Breastfeeding, The Use of Antidepressants in Pregnancy, Infections in Pregnancy, Contraception- A Pharmacist's Guide to Helping Women Make Informed Choices, and A Pharmacist's Guide to Contraception Products- How to Counsel.<sup>136</sup> These programs help pharmacists maintain their professional competency in the area of maternal health and allow them to make informed decisions using the best possible information.

Other countries have similar organisations that facilitate continuing education programs. In the United States, the Accreditation Council for Pharmacy Education provides pharmacists access to continuing education programs, many of which address maternal health topics.<sup>137</sup> There is an abundance of online pharmacist continuing education programs in the area of maternal health; these are available to pharmacists internationally. Through completion of these programs, pharmacists continue to advance their professional development and learn new skills that allow them to participate in the provision of care within maternal health.

In Australia<sup>138,139</sup> or in the United Kingdom,<sup>140</sup> specific programmes have been developed on medicines and breastfeeding/ pregnancy. Similarly, in Spain, the Colegios de Farmacéuticos organise education activities on medicines during pregnancy and breastfeeding to increase the competency of pharmacists in maternal health.<sup>141,142</sup> Moreover, Maternal, Newborn and Child health was part of the four year continuing education national plan developed by the Consejo General de Colegios Oficiales de Farmacéuticos.<sup>143,144</sup>

In Nigeria, the Pharmacists' Council (the regulatory body for the practice of the profession), places emphasis on the use of medicines in pregnancy and lactation by including this in the curriculum of its annual mandatory continuing professional development series (MCPD) which is a pre-requisite for the annual practising pharmacists' licence.<sup>145-147</sup>

In Argentina, the Confederación Farmacéutica Argentina organised in 2009 online courses on the use of medicines during pregnancy and breastfeeding followed by over 500 pharmacists.<sup>148</sup>

Similarly, in Portugal, the National Association of Pharmacies has organised e-learning activities on family planning.<sup>149</sup>

## **Role 4 - Contribute to improve effectiveness of the health care system and public health**

### **1) Disseminate evaluated health information about medicines and various aspects of self-care**

Pharmacists are highly trained to provide education to individual patients; however, they also participate in group education campaigns. These campaigns are directed at patients and the general public, but can also be geared towards other healthcare professionals, such as physicians, midwives, nurses, and other allied healthcare providers.<sup>150</sup>

In Zimbabwe, Tanzania and Ghana pharmacists have been involved in a malaria education campaign. The goal of this campaign was to promote awareness of malaria prevention and discuss early treatment.<sup>151</sup> Malaria continues to be an issue in maternal health for women living in developing countries. The contributions of pharmacists in educational campaigns like this helps to promote maternal health initiatives and impact health outcomes for these patients.

Pharmacists in the United States participated in a national folic acid campaign that aimed to educate the public about the use of folic acid to prevent serious birth defects. The activities undertaken by pharmacists included the addition of a folic acid sticker to prescription vials for female patients, displaying information materials, and using promotional materials to prompt women to ask pharmacists about folic acid.<sup>152</sup> In Denmark, pharmacists have developed a campaign stressing the importance of folic acid intake during pregnancy.<sup>153</sup>

Pharmacists who work in the community encounter the most hard-to-reach and vulnerable patients, including homeless mothers and women with multiple risk factors for adverse health outcomes. Pharmacists in the United Kingdom work in collaboration with health visitors, midwives, and other healthcare professionals to provide support, information and advice to women who need it most. Pharmacists also have an important role in promoting healthy lifestyle messages in relation to nutrition, physical activity and reducing alcohol intake.<sup>154</sup> These activities have a positive impact on maternal health.

Educational poster campaigns for pharmacies also have been implemented in a number of countries. For example, the Liberian social marketing program distributed a pharmacy poster that asks, "Does a woman pass the test for oral contraceptives?" This poster reminds pharmacy staff to assess women using a set of four screening questions concerning Pregnancy/breastfeeding, Age, Smoking and Sickness. In Ghana a colourful poster for pharmacists includes a similar, five point checklist on oral contraceptive use.<sup>155</sup>

In many countries, pharmacists are involved in the education of patients on specific diseases such as in France on the management of herpes for women before and during pregnancy<sup>156-158</sup> or in Finland on women's health issues.<sup>159</sup>

## **2) Engage in preventive care activities and services**

Pharmacists' involvement in maternal health includes preventive care activities and services. To illustrate this, two examples are presented of health promotion and preventive activities in which pharmacists are involved are smoking cessation and breastfeeding promotion.

The role of pharmacists within smoking cessation for mothers includes a large patient education component. Pharmacists are in the frontline contact with smokers and help guide them in their decision to quit smoking. Pharmacists' involvement in smoking cessation is of particular importance for pregnant women because of the adverse maternal, foetal and infant outcomes of cigarette smoking during pregnancy.<sup>160</sup> Pharmacists assess women who are planning to become pregnant and develop an appropriate smoking cessation plan prior to conception. Pharmacists are accessible for smokers and have regular contact with these patients. The adverse outcomes of smoking during pregnancy are explained to mothers and by providing education about smoking cessation pharmacists may be able to prevent harms to both mother and child.<sup>160</sup> Whenever appropriate, pharmacists can also refer pregnant women to medical doctors and specialists to help them to quit smoking.<sup>161</sup>

An initiative in Scotland entitled, "Give it up for baby" offered incentives such as grocery vouchers, free nicotine replacement therapy and one-on-one counselling to pregnant smokers. Pharmacists recruited patients, provided nicotine replacement therapy with counselling and offered support to patients throughout the program. The role of the pharmacists was recognised as being, "critically important" for delivery of the interventions and support of patients.<sup>162</sup> Women who smoke while pregnant benefit from education from pharmacists about the risks, for both maternal and child health. This information helps pregnant mothers to make decisions about smoking and promotes cessation to ensure a safe and healthy pregnancy.

Pharmacists provide counselling and education about healthy nutrition of future mothers alone<sup>163</sup> or as a member of a multidisciplinary team.<sup>164</sup> They also promote healthy infant nutrition among breastfeeding mothers.<sup>113</sup> Pharmacists counsel and educate women who are breastfeeding on non-pharmacological measures such as diet, eating habits and weight gain.<sup>80</sup> Hospital pharmacists have educated HIV-positive mothers about breastfeeding.

In many countries, pharmacists are involved in dispensing formula milk and use this opportunity to advise mothers on best practice.<sup>51,165-167</sup> In some countries, some formula milk for infants can only be dispensed in community pharmacies as it is part of their monopoly.<sup>168</sup>

The other functions of pharmacists within maternal health include elements of preventive care. These have been discussed previously in this paper and include:

- Provision of and education surrounding contraception, including emergency contraception
- Management of medications of HIV positive mothers to reduce the risk of transmission to the infant
- Administration of vaccines
- Offering Chlamydia screening programs
- Screening women for risk factors that may adversely affect maternal health

- Screening pregnant women for comorbid conditions and participation in management of these conditions as a member of the healthcare team
- Participation in weight management programs for women with a BMI of 30 or more
- Management of maternal nutrition, including vitamin supplementation with folic acid, vitamin C, and vitamin D
- Provision of non-pharmacological alternatives to women
- Participation in iron-supplementation programs
- Provision of pharmaceutical care as members of inpatient and outpatient obstetrics and gynaecology healthcare teams
- Management of medications during pregnancy and breastfeeding to identify any inappropriate therapy
- Addressing non-adherence to anti-retroviral medications
- Assessment of homeless or vulnerable mothers
- Counselling on appropriate use and interpretation of devices, such as pregnancy and ovulation tests

### **3) Comply with national professional obligations, guidelines and legislations**

In some countries, as part of their obligations, pharmacists have to ensure a proper access to emergency contraceptive pills.

In some countries, such as in France, pharmacists have the professional duty to provide contraceptive means, including emergency contraceptive pills. The only legal reason a pharmacist can refuse to dispense this medication is for the patient's health interests; therefore, there is no conscience clause in France.<sup>169</sup>

In other countries like in Canada, there are provincial guidelines that permit the refusal to dispense a medication based on moral or religious conflict; that is, pharmacists can object as a matter of conscience. Pharmacists hold the health and safety of the public as their first consideration during all practice. If pharmacists refuse to dispense a medication, such as emergency contraception, they adhere to their obligation and have to refer the patient to another facility from which to obtain the medication.<sup>170</sup>

In France, the Decree enabling pharmacists to dispense emergency contraceptive pills including to adolescents refers explicitly to the pharmacists' Code of Ethics (former art. R5015-48 du Code de la Santé Publique and now art. Article R4235-48 du Code de la Santé Publique), i.e. their duty to provide advice and information.<sup>169</sup>

Many countries have developed guidelines and standard operating procedures for the dispensing of emergency contraceptive pills, such as Scotland.<sup>171</sup>

Pharmacists have the duty to comply with their Codes of Ethics, especially with regards to confidentiality when dispensing emergency hormonal contraception to young women.<sup>154</sup>

In the United Kingdom<sup>93</sup> and Australia<sup>172</sup>, pharmacists are integrated into the guidelines on breastfeeding. They encourage and support breastfeeding, support proper nutrition of breastfeeding mothers and promote the safety of medication use among breastfeeding mothers. In Spain, pharmacists provide advanced counselling for pregnant and breastfeeding women.<sup>173</sup>

In the United Kingdom, the establishment of Patient Group Directions (direction to a nurse or other healthcare professionals to supply and/or administer prescription-only medicines (POMs) to patients using their own assessment of patient need, without necessarily referring back to a doctor for an individual prescription) requires that such Directions are not only signed by a authorized prescriber but also by a pharmacist, as an additional safeguard.<sup>174</sup> Many Patient Group Directions have been established throughout the United Kingdom on Maternal health issues.<sup>86,175,176</sup>

#### **4) Advocate and support national policies that promote improved maternal health outcomes**

Certain programs and services developed globally take into consideration and align themselves with national policies in order to help support future maternal-child health-related goals. For example, the maternal and infant health services development template, created by The Pharmacy Guild of Australia, supports and aligns aspects of the policy to many initiatives within the government such as: National Chronic Disease Strategy, National Service Improvement Framework for Diabetes, Australian National Breastfeeding Strategy, National Tobacco Strategy, etc.<sup>51</sup> These national efforts promote good maternal health and support the pharmacist's role in provision of care to mothers.

## NEWBORN AND CHILD HEALTH

### **Role 1: Prepare, obtain, store, secure, distribute, administer, dispense and dispose of medical products**

#### **1) Prepare extemporaneous medicine preparations and medical products**

##### **a) Ensuring the quality and safety during the production of medicines**

In many settings, whether in a manufacturing plant, at a community pharmacy or within a hospital, pharmacists are responsible for ensuring that there are no deficiencies affecting quality, purity or potency of medicinal products.<sup>17-19</sup>

In line with this activity and aiming to reduce the number of children admitted to the emergency room due to poisoning, pharmacists have developed and ensured the use of child-resistant packaging during the production of marketed products or compounding medicines.<sup>177</sup> Moreover, in some countries where pharmacists dispense from bulk, the containers they provide are also child-resistant.<sup>177</sup>

##### **b) Providing medical products suitable to children when not available on the market**

To achieve desired therapeutic outcomes in paediatric patients, access to age-appropriate, stable, effective, and well-tolerated medicine formulations is essential.<sup>178</sup> However, for many medicines, no appropriate paediatric formulation has been approved by the local Drug Regulatory Agency.<sup>179</sup> It was estimated that at least one unlicensed or off-label medicine is received by 90% of babies in UK neonatal intensive care, by 70% of UK patients in paediatric intensive care and by 67% of children in hospital across Europe.<sup>180</sup>

In many settings, including hospitals, pharmacists are key players in ensuring that the appropriate formulations and dosage forms are available to paediatric patients through their compounding activities.<sup>13,130,178,181,182</sup> Some pharmacists have even specialized in paediatric medicine formulations<sup>183</sup> to integrate the specificities of childhood pharmacokinetics in their activities.<sup>184</sup> In Portugal, pharmacists have also developed a “Galenic Formulary” which includes paediatric formulas. Each formula has been selected, using the following criteria: relevance of this formula, the need for such a formula (to meet therapeutic gaps) and frequency of prescription of this formula.<sup>185</sup>

To create dosage forms suitable for children, pharmacists often adapt adults’ medications for children<sup>186</sup> and may change the form to make it more child-friendly. For instance hospital pharmacists compound preparations of morphine to treat abstinence syndrome in newborns exposed to buprenorphine or methadone.<sup>187</sup> They can also help children with chronic feeding and/or swallowing difficulties<sup>188</sup> by changing formulations from a solid dosage forms into a liquid form.<sup>179</sup> They can also improve the taste of medicines by making them more palatable for children through the use of new excipients and improved formulations.<sup>189</sup>

Their compounding activities go well beyond medicines. In the hospital setting, pharmacists can also be involved in the preparation of sterile products such as individualised parenteral nutrition solutions for children and neonates.<sup>13,190</sup>

Not only are pharmacists compounding paediatric medicines which are not available, but they also prevent treatment discontinuation related to shortages or back-orders.<sup>186</sup> For example, when the children's liquid version of the anti-influenza medicine oseltamivir was in short supply, pharmacists were making their own children's version by mixing cherry syrup with the contents of oseltamivir capsules.<sup>186</sup>

### **c) Reconstitution of medicines**

In addition to their compounding activities, pharmacists reconstitute powder formulations into a liquid product before its administration to the patient, in accordance with the instructions of the manufacturer, often for antibiotics. This reconstitution can be made by hospital and community pharmacists<sup>191</sup> and may prevent inappropriate reconstitution by the parents.

### **d) Taking part in research and development on new formulations for children**

Finally, pharmacists are involved in new research development for different formulations suitable for children, primarily in industry and academia. For instance, they take part in ensuring stability and optimal bioavailability. Others are also involved in reviewing pharmaceutical paediatric formulation and medical products, excipients and dosages.<sup>192</sup>

## **2) Obtain, store and secure medicine preparations and medical products**

Through their expertise in the selection of medicines and in stock management, pharmacists have a positive impact on the continuous availability of medical products and other goods.

For instance, pharmacists play a critical role in developing and maintaining a formulary at international level<sup>193</sup> or at local level, especially at the hospital. Pharmacists improve the quality of healthcare of paediatric in-patients through the inclusion of adequate medicine presentations in the hospital formulary, and their careful evaluation of the need of the intravenous route.<sup>194</sup> Moreover, during the development of an appropriate essential medicines list for children, they take into account the available formulation and storage requirements, thus contributing in improving the use of medicines for children.<sup>195</sup>

Hospital pharmacists working in services for children and young people make arrangements for the child's treatment following discharge. This includes liaising with community services to prevent medication shortages and ensuring availability of treatment, plus continuity of products with similar bioavailability.<sup>154</sup>

Last but not least, community pharmacists influence the availability of products which are key in the prevention of diseases, such as insecticide-treated bed nets, fortified food, oral rehydration salts

(ORS), or soap. These goods are important to prevent diarrheal disease, malaria and many other paediatric diseases.<sup>196</sup> To complete the dispensing of such products, pharmacists offer advice on the management of paediatric diarrheal diseases.<sup>197</sup>

### **3) Distribute medicine preparations and medical products**

Pharmacists ensure that products they distribute are safe and not counterfeit. Adulterated syrup where glycerine (or similar products) has been replaced by Di-Ethylene Glycol (DEG) has been a cause of children death in several countries (see Table 2 - Examples of cases of adulterated paracetamol syrup for child). Pharmacists can prevent these products from reaching children through ordering only from reliable and authorised sources and by detecting them when receiving their order.<sup>198</sup>

Country	Year	Consequences	Type of products
Bangladesh	1990/1992	237 deaths	Paracetamol syrup with DEG
Haiti	1995/1996	89 children died	Glycerine containing DEG
India	1986	14 deaths	Paracetamol syrup with DEG
	1998	33 children died	
Nigeria	1991	100 children died	Elixir paracetamol with DEG instead of propylene glycol
Panama	2006	100 – 395 deaths, most of them being children	Cold medicine where glycerine was mixed with DEG

**Table 2 - Examples of cases of adulterated paracetamol syrup for child  
Adapted from references 199 and 200**

### **4) Administration of medicines, vaccines and other injectable medications**

Due to their availability,<sup>53</sup> pharmacists play an important role advocating proper immunization<sup>201</sup> through the education of children<sup>202</sup> and parents<sup>53</sup> on vaccines and other relevant means.

Moreover, through their patient file and a proper documentation of the vaccination histories, pharmacists inform parents on their children’s immunization status and remind them of the need of a future immunization<sup>203,204</sup> thus contributing to increase vaccine coverage.

Beyond their advocacy roles and through their involvement in pharmacovigilance, pharmacists along with other healthcare professionals, submit notification of adverse events following immunization (AEFI) and therefore facilitate the monitoring of vaccine safety.<sup>205</sup>



Their contribution to immunization policy has been further enlarged by their active role in the administration of vaccines.<sup>53</sup> Pharmacists have implemented immunization clinics in their pharmacies, thereby contributing to increased access to vaccines.<sup>203,206</sup>

In some states of the United States,<sup>206</sup> such as in Virginia,<sup>207</sup> Oregon,<sup>208</sup> Maine<sup>209</sup> or Missouri,<sup>210</sup> trained pharmacists can immunize children. In Oregon for instance,<sup>208</sup> pharmacists can administer vaccines to adolescents starting at 11 years of age to prevent the following diseases: Haemophilus Influenzae B, Hepatitis A, Hepatitis B, HPV, Japanese Encephalitis, MMR, Meningococcal Polysaccharide, Polio, Rabies, Typhus, Typhoid, Varicella, and Yellow Fever. In some Canadian provinces, pharmacists can also immunize children over 5 years.<sup>211</sup> In the United Kingdom, trained pharmacists can also administer vaccines to children over 2 years<sup>212</sup> or over 6 months,<sup>213</sup> depending on the types of vaccines.

Too many children worldwide still remain only partially immunized which may sometimes be explained by the inconvenience of getting to the service provider.<sup>214</sup> According to mothers, convenience of location and hours of operation are the most important assets of community pharmacies as sites for vaccines administration.<sup>215</sup>

## 5) Dispensing of medical products

Pharmacists play a large role in dispensing appropriate paediatric treatment.<sup>216</sup> For instance, when dispensing effective diarrhoea treatment, pharmacists provide information to patients and counselling on appropriate medication use.<sup>196,217,218</sup> This counselling role is recognised by mothers as they make extensive use of pharmacies when seeking advice and treatment for minor illnesses in their children.<sup>219,220</sup>

The role of private practitioners (including pharmacists, drug-sellers and traditional healers) in the provision of care to children (even from the poorest households) is important in many developing countries. For instance, it was noted that the proportion of the poorest children receiving care from private providers ranged from 34% to 96% for diarrhoea and from 37% to 99% for Acute Respiratory Infections (ARI).<sup>196</sup> This is particularly of relevance considering that from 50 to 70 percent of children who die never come in contact with the formal public health system.<sup>221</sup>

Pharmacists' capability of handling minor illnesses of children was recognised in 60 Primary Care Trusts<sup>a</sup> in the United Kingdom, where community pharmacists can supply medicines from a limited

---

<sup>a</sup> An NHS primary care trust (PCT) is [...] part of the National Health Service in England, that provides some primary and community services or commission them from other providers, and are involved in commissioning secondary care. [...] Collectively PCTs are responsible for spending around 80% of the total NHS budget. [...]

PCTs have their own budgets and set their own priorities, within the overriding priorities and budgets set by the relevant Strategic Health Authority they belong to, and the Department of Health. They directly provide a range of community health services; they provide funding for general practitioners and medical prescriptions; they also commission hospital and mental health services from appropriate NHS trusts or from the private sector. (This activity makes them the analogue of "payors" in the United States). In 2007, there were 152 PCT in England.

formulary for children on the National Health Service (NHS) as part of the agreement between the local NHS and their representatives. As a result, evaluation over 4 years, showed a 40% transfer of consultations from general practitioners to pharmacists.<sup>154,222</sup> The potential of this set of activities is even greater: evidence also shows that 20% of calls to a primary care out-of-hours centre and at least 8% accident and emergency department consultations could be handled by a community pharmacist.<sup>154</sup> One can easily imagine the impact of this transfer in terms of cost containment and workload of physicians and healthcare systems.

Moreover, during the dispensing of products, pharmacists play an important role by preventing child-poisoning from medicines, which is the most common poisoning of children in the USA.<sup>223</sup> This role is ensured through the provision of child-resistant packaging in countries where dispensing is made out of bulk<sup>177</sup> and through reminding parents on the possible dangers of the medication being dispensed.<sup>224</sup>

Through dispensing medicines, pharmacists also play a role in assuring the appropriateness of treatment and reviewing medicine regimens which is further discussed in the following sections.

## **6) Dispose of medicine preparations and medical products**

Even after the dispensing of medical products, pharmacists ensure the safety of children, through the safe disposal of expired or non-used medicines,<sup>130</sup> including through national programmes they are involved in.<sup>70</sup> Such activities could be supported by other programmes such as the brown bag medication reviews.<sup>69</sup> By reducing the medicines available at home, the risk of child poisoning is reduced.

At community pharmacy and at hospital level pharmacists are in charge of implementing medicines recall,<sup>225-227</sup> including informing parents regarding these recalled medicines<sup>228,229</sup> in order to prevent future complications related to the quality defect which could result in emergency room visits.<sup>230</sup> Through a proper disposal, these medicines will be effectively and appropriately disposed of so that they pose no danger to children.<sup>228</sup>

## **Role 2: Provide effective medication therapy management**

Due to many factors, children have an increased vulnerability to medication misadventure (with a potential adverse drug events rate three times higher than for adult patients for inpatients<sup>231</sup>). It has been estimated that the rate for adverse drug events for hospitalised paediatric patients in the United States was 11.1 per 100 admissions.<sup>232</sup>

Pharmacists in both Hospital and Community settings are often in an ideal position to provide medication management, monitoring and education services to maintain and improve patient care.

Such a position was recognised for instance by the American Academy of Pediatrics<sup>231</sup> and the inclusion of pharmacists in medical wards in the hospital is listed as the most effective strategy to prevent medication errors.<sup>234</sup>

## **1) Assess patients' health status and needs**

Pharmacist assessment ensures unique patient considerations which are met on an individual basis to enable effective medication management. As primary contact persons in the health care system, pharmacists assess health status in order to ensure their patients receive the most appropriate treatment.

Hospital pharmacists also assess health status and needs through collecting and recording demographic, clinical, and medication-related information.<sup>235</sup>

This assessment also integrates educational level and mental capacity of the children and their parents, so that the information provided by pharmacists will be properly understood, especially by children.<sup>135</sup> Pharmacists are able to assess whether parents can correctly measure a dose when given an accurate measuring device<sup>236-238</sup> and if needed, they may recommend an alternative, which may be easier to use.

Such assessments enable them to prevent unnecessary treatment and recommend the most appropriate treatment, such as in diarrhea<sup>196</sup> or for the treatment of ear infections (which usually don't require antibiotics)<sup>196</sup> and play a role in contributing to policies aiming at "*Reduc[ing] the number of courses of antibiotics for ear infections for young children*".<sup>91</sup>

Based on these assessments, pharmacists can counsel mothers on babies' minor ailments and help them to protect their children from preventable infections.<sup>203,239</sup>

Their activities and services based on these types of assessment result in decreased workload for other healthcare professionals through a transfer of consultations from general practitioners, out-of-hours centers and emergency department to pharmacists,<sup>154,222</sup> as well as cost savings and improved dosing of medications.<sup>240</sup>

## **2) Manage patient medication therapy**

Pharmacists play a crucial role in medication therapy management founded on appropriate evidence based references such as journals, standard treatment guidelines, and establishing standard operating procedures where necessary.

For example, in a report of the UK Government, pharmacists are described as playing a central role in the safe and effective use of medicines for children and young people,<sup>154</sup> for instance through the provision of a comprehensive medication therapy management.<sup>91,154,241</sup> This role can be fostered

through specialization in neonatal or paediatric pharmacy, or in a specific field such as oncology, intensive care, cardiac and renal medicine or within multidisciplinary teams. For instance, a study showed that unit-based pharmacists participating in medical rounds with the medical team can decrease serious medication errors in critically ill paediatric patients by 79%.<sup>242</sup>

One area where pharmacists play a particularly important role is in the management of paediatric asthma. In many countries pharmacists provide education to paediatric patients with asthma, help them better understand their medications and how their medications help to manage their disease. The overall clinical outcome of these services includes improved asthma knowledge, symptoms, inhaler technique, and quality of life.<sup>243-249</sup>

For example, in Canada community pharmacists hold clinic days for both children and adults with asthma. In one-on-one counselling sessions, pharmacists determine each patient's educational needs and provide appropriate medication counselling. Patients that participate in the clinic days have reported significant decreases in the frequency of daytime asthma symptoms, the frequency of nocturnal symptoms and the frequency with which short acting beta2-agonists need to be used. They also reported significant increases in their use of preventative medications like inhaled corticosteroids.<sup>246</sup> Furthermore, Clinic days have reduced symptoms by 50%, peak flow readings increased by 11%, days off school by approx 0.6 days/month. Also, patients reported improvements in quality of life by 19%.<sup>246</sup> Another study from the United States found that pharmacists counselling hospitalized paediatric patients with asthma decreases emergency room visit or hospitalization by 52%.<sup>250</sup>

In addition to providing asthma education via clinic days, in South Africa hospital pharmacists use their pharmacokinetic expertise to monitor the efficacy and safety of complex asthma medications, like theophylline.<sup>235</sup>

Furthermore, through inter-professional collaboration, community pharmacists manage and coordinate a multidisciplinary asthma team leading to improved lung function, reduced exacerbations and hospitalizations.<sup>91,241</sup>

Therefore, pharmacists provide services which are paramount in order to improve the quality use of medicines for children.<sup>91</sup> The following paragraphs will expand on these services aiming to improve the quality of medicines use in children.

### **a) Improving the selection of medicines**

In the USA, in 74% of medication error cases, the error was made at the prescribing stage.<sup>231</sup> The most common errors in paediatrics are dosing errors at the time of prescribing.<sup>231</sup> Pharmacists' activities have been shown to decrease errors and maximise efficiency in prescribing.<sup>251,252</sup> a study reported a reduction of 31.6% of the prescribing errors through pharmacists' activities (11.1% to 7.6% of prescription containing an error).<sup>252</sup>

For instance, hospital pharmacists assist physicians during ward rounds (resulting in 82% reduction in medication errors for paediatric patients<sup>234</sup>), and make suggestions for new medication

therapies or changes to existing treatment plans.<sup>252</sup> They provide input to prescribing decisions and ensure children are receiving appropriate treatments.<sup>28,95</sup> This also includes specific areas such as intensive care units,<sup>240,253,254</sup> epilepsy, oncology services<sup>251</sup> and providing HIV care to children.<sup>255</sup> Pharmacists answer medicines-related questions from the healthcare team on daily basis;<sup>251</sup> they also advise clinically as well as on legal aspects of using unregistered medicines<sup>179,255</sup> to ensure their effective and safe use.<sup>256</sup>

Pharmacists also review chemotherapy protocols and create pre-printed orders used by the oncology service to order, dispense and administer specific chemotherapy,<sup>251</sup> therefore by offering these tools for prescribers they ensure that prescriptions follow guidelines and are appropriate. Such a process can be facilitated by the implementation of computerized physician order entry (CPOE) systems in which pharmacists play a key role.<sup>257-260</sup>

In other hospital settings, pharmacists have the autonomy to write chemotherapy orders which are signed by the oncologists.<sup>251</sup>

As these actions also have an educational role toward prescribers, they can be further reinforced by lectures to prescribers, resulting in decreased number of prescribing errors.<sup>252</sup> This is especially important for patients who are at higher risk of medication errors such as neonates or children in intensive care settings.<sup>231,242,253,261,262</sup>

In a community pharmacy setting, pharmacists recommend appropriate medicines to treat minor ailments of children,<sup>239</sup> including the use of oral rehydration solutions to prevent dehydration for children with diarrhea.<sup>196</sup>

They also contact the prescriber to suggest changes and recommendations whenever appropriate. For instance, in many countries, prescribing an antibiotic for minor ailments is inappropriate<sup>91</sup> or the choice of the antibiotic is not in line with the most common pathogens;<sup>263,264</sup> in such cases, pharmacists can contact the prescriber to ensure rational prescription of antibiotics and thereby prevent future resistance and unnecessary side effects.<sup>265</sup> In hospitals, pharmacists are also responsible for providing information and intervention for the correct and appropriate use of antibiotics in children.<sup>266</sup>

Pharmacists have the option of substituting a sugar-free version of a prescribed medicine and endorsing the prescription, in order to help prevent dental caries especially for paediatric patients on long-term medication, with poor dental hygiene or difficult dental treatment due to their medical condition.<sup>267</sup>

## **b) Reviewing pharmacotherapy**

Hospital pharmacists conducting medication reconciliation services at the time of admission and discharge is recommended for paediatric patients.<sup>268,269</sup> On admission, pharmacists document and then review the patient's current regimen of prescription medicines including over the counter

medicines and complementary medicines, with the parent and child in departments such as oncology, paediatric neurosurgery<sup>251,269</sup> and the intensive care units.<sup>242,251-253,261</sup>

Pharmacists also conduct medication reviews aimed at detecting medication errors. Clinical hospital pharmacists on ward rounds in an institutional setting<sup>270,271</sup> can provide a basic medication review, which is often referred to as a medication chart review.<sup>272,273</sup> This review entails monitoring for drug therapy interactions, adverse effects or reactions and to clarify the medicine order. This review is often geared to short-term clinical issues in the acute care setting. Through this process, pharmacists also advise when a child can be switched from parenteral therapy to oral medications.<sup>274</sup>

Community pharmacists also perform this basic level of review at the time of dispensing, where they review a patient's history in conjunction with the new prescription to detect a variety of potential drug related problems such as appropriateness of treatment and accuracy of dose.<sup>271,275-277</sup> Evidence shows that these medication reviews are especially helpful in children with asthma as many prescriptions written for children with asthma can be inappropriate (e.g. combination inhaled therapies prescribed too early in childhood asthma)<sup>278</sup> and epilepsy as pharmacists are able to rationalise and improve anticonvulsant drug therapy.<sup>279</sup>

Pharmacists also provide more comprehensive medication reviews, particularly relevant for chronic conditions and undertaken in a primary care setting. This review is comprised of a systematic evaluation of a patient's medication treatment regimen in the context of additional clinical information and the patient's health status. It implies a team approach including the patient, pharmacist, medical practitioner and other health professionals as needed.<sup>280</sup>

Through the medication review process, pharmacists make recommendations on appropriate dose adjustments,<sup>235,240</sup> intercept potentially harmful medication errors,<sup>259</sup> determine patient adherence, identify drug related problems and take action where necessary such as educating nurses and developing internal guidelines. This results in better drug treatment<sup>281</sup> and cost savings.<sup>240</sup>

Finally, in order to ensure seamless care and decrease prescribing errors for children when discharged to the community setting or to another service/hospital, pharmacists ensure a proper transfer of information through an order for discharge medicines to be dispensed or transfer notes. These documents summarise the patient's medications, identify drug-related problems and evaluate their current medication calendar which leads to a decrease in the number of pharmaceutical care issues detected by community pharmacists post discharge.<sup>251,282</sup> Pharmacists also review discharge orders enabling children to receive their medication in a more timely manner.<sup>283</sup>

### **c) Ensuring appropriate medication administration**

Pharmacists have an impact on medication administration. Administering the correct dose of a medicine is critical to children, as they are vulnerable to overdosing or underdosing.<sup>260</sup> The most common errors in administration are related to dose calculation (often based on the weight and age of the child) or the measuring of the proper amount of liquid.

#### ■ Hospital setting

Many medication administration errors occur in the in-patient setting and are often under-reported<sup>259,284</sup> and unnoticed.<sup>285</sup> Pharmacists help to collect information regarding medicines commonly administered in error and educate nurses on these case studies as well as provide techniques to avoid such errors. In many hospitals, pharmacists are engaged in institution-wide safety initiatives to decrease errors, which may include the implementation of standard concentrations of high-alert infusions in the emergency room, intensive care and operating rooms, initiatives that relied on pharmacy input.<sup>268</sup> Similarly, through the daily prescription review, hospital pharmacists decrease the number of compatibility errors for intravenous medications.<sup>286</sup>

Pharmacists give advice about formulation manipulation for children<sup>255</sup> to the healthcare team and especially nurses.

#### ■ Community setting

The most common errors in administration are related to OTC medicines,<sup>287</sup> including paracetamol, cough and cold preparations and ibuprofen<sup>287-289</sup> as well as salbutamol.<sup>260</sup> Common errors in administration of liquid medicines include misinterpreting instructions, confusing teaspoons with tablespoons and misreading a dosage chart when age and weight are discordant.<sup>290</sup>

In order to ensure appropriate administration by parents, pharmacists can ensure the provision of appropriate measuring tools such as oral dosing syringes<sup>291</sup> as they have clearly marked units, are accurate, easier to control, cause minimal spillage, may be used with viscous liquids and can easily measure small volumes.<sup>290</sup> This can help ensure the use of appropriate devices over inaccurate measuring tools.<sup>290-293</sup>

Moreover, community pharmacists educate parents and children on correct dosing and administration.<sup>182</sup> For example, they have been shown to improve parent's administration techniques and in-turn improve disease or symptom control, for examples in children aged 1-7 suffering from atopic eczema.<sup>294</sup>

### **3) Monitor patient progress and outcomes**

Considering that paediatric patients are more likely to experience adverse medicine misadventures, they often require close monitoring for which pharmacists are able to apply advanced pharmaceutical and therapeutic knowledge.<sup>13</sup> This monitoring activity occurs in both hospitals (including as part of a multidisciplinary team)<sup>254,295</sup> and in community settings.

It consists of monitoring for acute adverse medicine reactions physical signs or laboratory results indicating the appropriate response to medicines,<sup>235</sup> leading to a decreased number of adverse medication events<sup>295</sup> and medication errors,<sup>260</sup> substantial cost savings,<sup>254</sup> more appropriate prescribing<sup>296</sup> and a better medicine utilization.<sup>235,254</sup>

Through this monitoring and reporting to the relevant pharmacovigilance centres, pharmacists enhance the understanding of the nature and impact of these adverse drug reactions in children.<sup>297</sup>

Some studies have summarised the overall impact of hospital pharmacists' services in medication management for specific fields of interest. For example, Bussi eres et al.<sup>298</sup> summarized the impact of pharmacists' services in oncology.

	Number of references	Level of evidence*
Mortality	0	D
Morbidity	6	B
Drug Adverse Events	13	A
Medication errors	10	A
Quality of life	9	B
Costs	7	A
Duration of stay	0	D
Adherence	0	D

\* Level of evidence: A: very high-quality evidence supporting pharmaceutical activities in this field.  
 B: evidence with acceptable quality. C: evidence with insufficient quality. D: no evidence

**Table 3 - Data on evidence on the impact of pharmacists in paediatric oncology**  
 Translated and adapted from Bussi eres et al.<sup>298</sup>

The same study also studied the impact of specific pharmaceutical services within paediatric haematology oncology:



	Level of evidence	Level of practice for ACCP in intensive care†	Number of references
Review Medication Profile	A	Fundamental	12
Suggest optimal pharmacotherapy	A	Fundamental	10
Write-down proposed recommendations	A	Fundamental	7
Manage adverse events	A	Fundamental	12
Educate medical and paramedical staff	A	Fundamental	5
Ensure a pharmacokinetic follow-up	B	Fundamental	4
Ensure a follow-up for parenteral nutrition	C	Fundamental	1
Ensure medication reconciliation at admission	A	Desirable	6
Develop and implement guidelines and computerized procedures	A	Desirable	14
Take part in medical ward rounds	B	Desirable	3
Train and update their own knowledge	B	Desirable	3
Review / compare medications at discharge	D	Desirable	0
Counsel patient at discharge	A	Optimal	5
Invest in specialized areas (G-CSF, anticoagulothrapy...)	B	Optimal	4

† The American College of Clinical Pharmacy (ACCP) suggested a classification of pharmaceutical activities specific to critical care, into three levels: fundamental (i.e. essential to ensure the safe provision of pharmaceutical care to patients requiring critical care), desirable (i.e. including previous level and specific activities to critical care) and optimal (i.e. integrating the fundamental and desirable levels and complementary fields, including teaching and research).

**Table 4 - impact of specific pharmaceutical services associated with positive outcomes in haematological oncology**

Translated and adapted from Bussi eres et al.<sup>298</sup>

#### **4) Provide patient information about medicines and health-related issues**

Pharmacists are able to provide patient education in respect to paediatric medications to parents, caregivers, other health care professionals and to the children themselves.

Parents consider pharmacists a good source of reliable information, and commonly use their services.<sup>299</sup> Pharmacists' ability to counsel parents was found to be systematic and appropriate,<sup>300</sup> as this two way communication also enabled parents to ask questions to the pharmacists.<sup>237</sup>

Pharmacists provide both oral and written medicine information to parents,<sup>126</sup> which can be supported by easily understandable information leaflets for parents and carers developed jointly with paediatricians, through initiatives such as Medicines for Children.<sup>301</sup>

In the oncology departments, hospital pharmacists provide chemotherapy and supportive care information to parents and children at every stage of their therapy.<sup>251</sup> During the course of this

dialogue with caregivers, children's issues beyond medications are also discussed such as dietary needs, financial concerns or treatment planning.

Other specialised areas of hospital pharmacists providing education include asthma and HIV medicines. Pharmacists play a large role in providing asthma education resulting in decreased hospitalisations for paediatric patients with asthma.<sup>241</sup>

Hospital pharmacists in Africa have a key role in educating parents and children taking complex medication regimens such as HIV medicines.<sup>95</sup>

Finally, when a paediatric patient is discharged, hospital pharmacists provide the appropriate information to parents.

In a community pharmacy setting the pharmacist educates parents and children about both over-the-counter (OTC) medicines<sup>135</sup> and prescription medicines, to ensure safe and rational use of the medicines dispensed, as parents often lack knowledge regarding the content of OTC medicines<sup>238,302</sup> and how to administer them. This role is also important when new recommendations on medicines are made and cannot be implemented immediately. For instance, in France, the Drug Regulatory Authority (Afsaps) recommended in early 2010 that mucolytic medicines should not be administered to children younger than 2 years but this information could not be included in the patient leaflet before July 2010. In the meanwhile, community pharmacists when dispensing mucolytic medicines, highlighted this new information through the provision of a dedicated patient leaflet developed by the national pharmacists association.<sup>303</sup>

Pharmacists can give advice to mask the taste of medicines when dispensing them (e.g. to eat before or after specific food, to crush the tablet when appropriate...)<sup>302</sup>

In developing countries where Malaria is endemic, pharmacists provide information on how to use appropriate treatments to decrease the malaria burden.<sup>105</sup>

Pharmacists also educate on the proper use and storage of medicines and prevent some of the toxicities and over-doses in children taking medicines inappropriately.<sup>224,305,306</sup>

Pharmacists also create proper conditions to improve the capability of parents to integrate their advice, for example through the creation of a "children's corner" in the community pharmacy, where children that are too young to take part in the counselling can play, enabling the parent to concentrate on the information being delivered by pharmacists.<sup>300</sup>

Pharmacists have a role in educating children themselves. Many novel educational tools have been developed by pharmacists - such as websites - that provide games and activities to help children learn about pharmacists, health and the rational use of medicines.<sup>307</sup>

## **Role 3 - Maintain and improve professional performance**

### **1) Plan and implement continuing professional development strategies to improve current and future performance**

Through their initial education, pharmacists receive education on paediatric matters (on average, 16.7 hours is devoted to paediatric content in required courses in the USA),<sup>308</sup> on which they can further develop their competencies through a residency programme in many pharmacy departments of children's hospitals.<sup>309</sup>

Once their education is completed, and through their Continuing Professional Development (CPD), pharmacists can rely on competency standards developed by pharmacists' regulators or associations to understand their specific duties with regards to the management of paediatric patients. These standards of practice are also used by pharmacists to help them determine their educational needs and plan continuing education activities which will help them to maintain their competencies on child health.<sup>13,135</sup> Some pharmacy regulators even list or suggest appropriate subjects for continuing education which include child abuse reporting.<sup>310</sup> while specific continuing education on child protection is specifically organised by pharmacy staff. Furthermore, many schools of pharmacy and pharmaceutical associations throughout the world offer graduate pharmacists continuing education activities on child health.<sup>312-322</sup>

Similarly, some specific competency frameworks have been developed for pharmacists specialised in paediatrics,<sup>323</sup> or a specialisation for pharmacists in paediatrics is under discussion.<sup>324</sup> A distance learning package on paediatric pharmaceutical care has also been developed in the United Kingdom to further strengthen pharmacists' competencies in this field.<sup>325</sup> Some extensive education has also been developed for more specialised fields, such as paediatric critical care pharmacists.<sup>326</sup>

## **Role 4 - Contribute to improve effectiveness of the health care system and public health**

### **1) Disseminate evaluated information about medicines and various aspects of self-care**

Pharmacists contribute to improving the knowledge of paediatric medicines through detections and reporting of adverse drug reactions.<sup>297</sup>

Moreover, they are involved in educating other healthcare professionals on rational prescribing and on paediatric medicines in general, relying on evidence-based information.<sup>327</sup>

Their activities in information management are completed by ensuring that information disseminated to children and the public in general about products is accurate.<sup>328</sup>

As a consequence of this activity, pharmacists educate parents about rational and safe use of medicines for their children.<sup>329,330</sup> They empower mothers to care for their child through their advice

on minor ailments of their babies<sup>239,331-333</sup> and educate mothers on health matters relevant to their babies.<sup>329</sup>

Moreover, when dispensing medicines and through communication campaigns, pharmacists help prevent child poisoning and teach parents how to act if they are facing child poisoning.<sup>224,330,334,335</sup>

Their activities also target children themselves as they provide accurate and appropriate information to children regarding medicines and health care in general, and promote rational use of medicines.<sup>307,336-342</sup> They can also participate in the prevention of combining medicines and alcohol amongst high school pupils.<sup>343</sup> Furthermore they educate children on the role of pharmacists.<sup>202,307</sup>

Their impact on child health through better medicines use is also achieved through their activities towards other community members involved in child care and education. For instance, community pharmacists can educate teachers on medicines and drug abuse so that they can integrate this knowledge in their activities within schools.<sup>344</sup> They can also improve primary school teachers' knowledge of asthma and the related medications.<sup>345</sup> More generally, pharmacists advise on the management of medicines in schools regarding storage, handling, administration and disposal as well as staff training.<sup>267</sup>

## **2) Engage in preventive care activities and services**

Through their health promotion activities, pharmacists cover a wide scope of diseases, such as, skin cancer and the need for solar protection,<sup>346-348</sup> oral health,<sup>349</sup> H1N1 flu<sup>350</sup> or Dengue<sup>351</sup> to list only a few examples. This activity is even more crucial when epidemics occur, as it is often the community pharmacy that is the first port of call for many parents. During the influenza epidemic of 2009, pharmacists educated parents and children about influenza symptoms and treatment options.<sup>352</sup>

Moreover, through advocating proper immunization, pharmacists support disease prevention.<sup>201</sup>

Their activities also include the promotion of healthy lifestyles among children and their parents, such as healthy eating habits<sup>154,353-356</sup> or physical activity.<sup>154</sup>

They are also involved in the prevention of injuries<sup>357,358</sup> by educational activities targeting parents and their children, such as promoting bicycle helmets,<sup>135</sup> preventing drowning through key advice to patients who own houses with swimming pools<sup>359</sup> or preventing child poisoning through information on appropriate safe storage and disposal of household products, medications, non-prescription medicines and vitamins.<sup>135</sup>

Their capability to reach the most hard-to-reach and vulnerable families in their community in collaboration with other healthcare workers has been underlined in areas such as the United Kingdom.<sup>154</sup> This capability is of great interest as these families are the ones who require the most support, advice and information on healthy lifestyles.

Pharmacists can improve the impact of child health programmes in developing countries, in partnership with the private sector.<sup>196</sup>

### **3) Comply with national professional obligations, guidelines and legislations**

As for many other healthcare professionals, pharmacists' practices are highly guided by a set of texts, such as legislation, regulations, standards of practice or their Code of Ethics to list only a few.

These rules include specific requirements related to children's care which pharmacists must comply with.

For instance, when dispensing medicines from bulk, pharmacists in the province of Alberta (Canada) have the duty to provide a child-resistant packaging for any medicine.<sup>177</sup>

Similarly, in Australia, pharmacists are required to "*develop an appropriate formulation where no standard formulation exists, such as for paediatric formulation*". Paediatric patients are also described as belonging to high-risk patients, and therefore, pharmacists should ensure a closer follow-up. They are also required to "*apply advanced pharmaceutical and therapeutic knowledge to patients in specialized areas of clinical practice such as in paediatrics*".<sup>13</sup> To illustrate more general functions and roles of pharmacists, the Competencies Standards in Australia give examples of some duties of pharmacists applied to child health, such as providing immediate oral recommendations to a mother asking about the use of aspirin for fever in her infant or ensuring that their speech is at an appropriate level for children. To illustrate that pharmacists have to provide information on disease prevention and health promotion, the Standards list a set of activities including the appropriate safe storage of household products, medications, non-prescription medicines and vitamins around children or the requirement for bicycle helmets for children.<sup>135</sup>

Moreover, some rules have also been developed for specific (and often new) services offered by pharmacists, such as immunization. These rules can be either under the format of protocols (United States<sup>207</sup>) or integrated in the standard of practice (Canada<sup>211</sup>).

Finally, specific competency frameworks have been developed for paediatric pharmacists, such as in the United Kingdom.<sup>323</sup>

Of course, in addition to rules specific to children's care, pharmacists also have to comply with the general rules guiding their practice and ensuring that the optimal level of care is provided to any patient.

### **4) Advocate and support national policies that promote improved health outcomes**

As part of their involvement in health promotion activities (described earlier in parts IV.A and IV.B), pharmacists relay governmental campaigns on child health and reinforce the key messages of these campaigns.<sup>53</sup>

They also take a more pro-active role in supporting national policies through the development of their national associations of programmes and services responding to the strategies set by the government. For example, the Pharmacy Guild of Australia developed a specific maternal and infant health services development template which supports and aligns with several Strategies of the Australian government (such as its National Chronic Disease Strategy, National Service Improvement Framework for Diabetes, Australian National Breastfeeding Strategy, and National Tobacco Strategy).<sup>51</sup>

## CONCLUSIONS

This report illustrates the various ways pharmacists are currently improving maternal and child health using the Joint FIP/WHO Guidelines on Good Pharmacy Practice framework. Important health initiatives are being undertaken globally by pharmacists in community, hospital and industrial settings. These initiatives are also resulting in beneficial economic and humanistic outcomes.

There are many examples of how pharmacists improve health outcomes in both maternal and child health. In maternal health, pharmacists help prevent unwanted pregnancies by providing regular and emergency contraception. The provision of emergency contraception in pharmacies without a prescription correlates with a significant decrease in abortions. Pharmacists also provide education to children on asthma medications, resulting in appropriate inhaler use and reduced asthmatic symptoms. The roles outlined above ensure appropriate medication use and adherence, ultimately improving a patient's quality of life.

Pharmacists also improve health economic outcomes. For example, in some countries when patients obtain medications from a pharmacy instead of a physician or clinic, there are cost-savings for both private and public payers.

In relation to humanistic outcomes, mothers have reported increases in overall health care satisfaction when pharmacists provide patient education. Pharmacists further satisfy patients by providing essential health services, such as vaccinations for children, in the convenience of a community pharmacy.

It is evident that through effective medication distribution, medication management, professional performance, and improving healthcare effectiveness, pharmacists play a vital role in ensuring optimal health outcomes, economic outcomes and humanistic outcomes. Furthermore, some of the current pharmacist roles are in accordance with the WHO maternal, newborn and child health interventions. These roles are summarized in Table 5 below (page 48).

It is important to note that this paper has targeted key documented actions pharmacists are currently involved in and does not address potential contributions to maternal or child health. Potential pharmacists' interventions in maternal and child health will be addressed in a follow up report by the FIP.

Stage	WHO maternal, newborn and child health interventions	Current Pharmacist contribution in line with the WHO suggested interventions to high-priority countries	Extent of Implementation
Pre-Pregnancy	Contraception	- Supply and educate women on various contraceptives forms	Globally implemented
		- Prescribe and/or initiate emergency contraception	Limited to specific countries
Pregnancy	At least 4 antenatal visits	- Supply and educate mothers on vitamins and nutritional supplements - Promote cessation of alcohol and nicotine - Evaluation of potential teratogenic medicines	Implemented in most countries
	Prevention of mother-to-child-transmission	- Obtain, store and dispense appropriate antivirals - Promote and facilitate medication compliance - Educate communities and/or patients at high risk of disease transmission	Globally Implemented
	Intermittent preventive treatment of malaria for pregnant women	- Recommend drug therapy, dosages, and duration of therapy - Promote prevention and early treatment - Promote medication compliance - Supplying non-medicine products (e.g. insecticide-treated bed nets) - Educate communities at high risk	Limited to at risk communities
	Neonatal tetanus protection	- Not addressed	Not addressed
Birth	Skilled attendant at birth	- Make decisions regarding accessibility of critical medications in labor and delivery - Provide required sterile medical products during delivery	Limited to hospital pharmacy
Postnatal	Postnatal visits for mother	- Identify women at risk of post partum depression	Limited to hospital pharmacist in some countries
	Early initiation of Breastfeeding	- Support breastfeeding	Implemented in most countries
Infancy	Exclusive breastfeeding (less than age 6 months)	- Assess pharmacokinetics medicine distribution into breast milk - Patient education on healthy diet and physical activity - Recommend non-drug products to facilitate breast feeding	Globally Implemented
	Complementary breastfeeding (age 6-9 months)	- Not addressed	Not addressed
	Immunization: Measles and DPT3	- Patient Education vaccine importance - Documentation of vaccine history	Globally Implemented
		- Independently administer vaccines - immunization clinics in pharmacies	Limited to specific countries and/or regions
Vitamin A supplementation (two doses)	- Not addressed	Not addressed	
Childhood	Children sleeping under insecticide-treated nets	- Supply insecticide treated nets	Limited to specific countries and/or regions
	Care seeking for pneumonia	- Not addressed	Not addressed
	Antibiotics for Pneumonia	- Ensure no deficiencies in quality, purity or potency of medicinal products - Alter dosage forms to improve compliance	Limited to specific countries and/or regions
		Diarrhea Treatment	- Supply effective drug therapy - Ensure no deficiencies quality, purity or potency of medicinal products
			- Access to oral re-hydration salts
	Improved sanitation facilities	- Guide the public on the proper disposal of medications	Globally Implemented
Improved drinking water	- Not addressed	Not addressed	

**Table 5 – Summary of pharmacists’ contributions in line with WHO top interventions in MNCH**



## REFERENCES

- 1 World Health Organization. Health topics - Maternal Health. Geneva: World Health Organization; 2011 [cited 2011 Feb 11]. Available from: [http://www.who.int/topics/maternal\\_health/en/](http://www.who.int/topics/maternal_health/en/)
- 2 UNICEF. Maternal and newborn health. New York (NY): UNICEF; 2009 [cited 2011 Feb 11]. Available from: [http://www.unicef.org/health/index\\_maternalhealth.html](http://www.unicef.org/health/index_maternalhealth.html)
- 3 Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang M, Makela SM, Lopez AD, Lozano R, Murray CJ. Maternal mortality for 181 countries, 1980—2008: a systematic analysis of progress towards Millennium Development Goal 5. Lancet. 2010 May 8;375(9726):1609-23. Epub 2010 Apr 9.
- 4 World Health Organization and UNICEF. Countdown to 2015: taking stock of maternal, newborn & child survival - Decade Report (2000-2010). Geneva and New York: World Health Organization and UNICEF; 2010 [cited 2011 Feb 11]. Available from: [http://whqlibdoc.who.int/publications/2010/9789241599573\\_eng.pdf](http://whqlibdoc.who.int/publications/2010/9789241599573_eng.pdf)
- 5 Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, Dwyer L, Costa M, Lopez AD, Murray CJ. Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: a systematic analysis of progress towards Millennium Development Goal 4. Lancet. 2010 Jun 5;375(9730):1988-2008. Epub 2010 May 27.
- 6 United Nations General Assembly. A/RES/55/2 United Nations Millennium Declaration. New York: United Nations; 2000 [cited 2011 Feb 11]. Available from: <http://www.un.org/millennium/declaration/ares552e.pdf>
- 7 United Nations Statistics Division - Department of Economic and Social Affairs. Official list of MDG indicators [online]. New York: United Nations; 2008. [cited 2011 Feb 11] Available from: <http://unstats.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm>
- 8 United Nations. Global Strategy for Women's and Children's Health. New York: United Nations; 2010 [cited 2011 Feb 11]. Available from: [http://www.who.int/pmnch/topics/maternal/20100914\\_gswch\\_en.pdf](http://www.who.int/pmnch/topics/maternal/20100914_gswch_en.pdf)
- 9 World Health Organization and International Pharmaceutical Federation. Joint FIP/WHO guidelines on good pharmacy practice: standards for quality of pharmacy services *in* Forty-fifth report of the WHO Expert Committee on Specifications for Pharmaceutical Preparations (WHO technical report series ; no. 961). Geneva: World Health Organization; 2011
- 10 World Health Organization and International Pharmaceutical Federation. Developing pharmacy practice: a focus on patient care. Geneva and the Hague: World Health Organization and International Pharmaceutical Federation; 2006 [cited 2011 Feb 11]. Available from: <http://www.fip.org/files/fip/publications/DevelopingPharmacyPractice/DevelopingPharmacyPracticeEN.pdf>
- 11 The Basel Statements on the future of hospital pharmacy. Am J Health Syst Pharm. 2009 Mar 1;66(5 Suppl 3):S61-6 [cited 2011 Feb 11]. Available from: [http://www.ajhp.org/cgi/reprint/66/5\\_Supplement\\_3/s61](http://www.ajhp.org/cgi/reprint/66/5_Supplement_3/s61)

- 12 Allen LV. Contemporary Pharmaceutical Compounding. *Ann Pharmacother*. 2003;37(10):1526-1528.
- 13 Pharmaceutical Society of Australia. Competency Standards for Pharmacists in Australia. Canberra: Pharmaceutical Society of Australia; 2003 [cited 2011 Feb 11]. Available from: [www.psa.org.au/site.php?id=1123](http://www.psa.org.au/site.php?id=1123)
- 14 Albright LM. Sore Nipples in Breastfeeding Mothers: Causes and Treatments. *International Journal of Pharmaceutical Compounding*. 2003;7(6):426-35.
- 15 Williams KCD. All Purpose Nipple Ointment: A Compounding Solution to Common Problems with Breastfeeding. *International Journal of Pharmaceutical Compounding*. 2010;14(6):484-7.
- 16 Armstrong J. Unintended Consequences — The Cost of Preventing Preterm Births after FDA Approval of a Branded Version of 17OHP. *N Engl J Med*. 2011 May 5;364(18):1689-91. Epub 2011 Mar 16.
- 17 General Pharmaceutical Council. Role of the pharmacist [Internet]. London: General Pharmaceutical Council; 2011 [cited 2011 Feb 11]. Available from: <http://www.pharmacyregulation.org/ourpublicfocus/whatyoucanexpect/roleofthepharmacist/index.aspx>
- 18 Pharmacy Compounding Accreditation Board. PCAB Standards with compliance indicators Edition 7.3. Washington DC: Pharmacy Compounding Accreditation Board; 2010 [cited 2011 Feb 11]. Available from: [www.pcab.info/downloads/pcab-standards.pdf](http://www.pcab.info/downloads/pcab-standards.pdf)
- 19 France. Article R5124-36 du Code de la Santé Publique [cited 2011 Feb 11]. Available from: <http://www.legifrance.gouv.fr/affichCode.do?idArticle=LEGIARTI000006915127&idSectionTA=LEGISCTAO00006196569&cidTexte=LEGITEXT000006072665&dateTexte=20110119>
- 20 Arizona Department of Health Services. Consumer Condom Availability & Access to Purchase Report. Phoenix: Arizona Department of Health Services; 2007 Jan [cited 2011 Feb 11]. Available from: [www.azdhs.gov/phs/hiv/pdf/CondomSurvey.pdf](http://www.azdhs.gov/phs/hiv/pdf/CondomSurvey.pdf)
- 21 World Health Organization. WHO Model Lists of Essential Medicines. Geneva: World Health Organization; 2010 [cited 2011 Feb 11]. Available from: [www.who.int/medicines/publications/essentialmedicines/en/](http://www.who.int/medicines/publications/essentialmedicines/en/)
- 22 Fijn R, Brouwers JR, Knaap RJ, De Jong-Van Den Berg LT. Drug and Therapeutics (D & T) committees in Dutch hospitals: a nation-wide survey of structure, activities, and drug selection procedures. *Br J Clin Pharmacol*. 1999 Aug;48(2):239-46.
- 23 World Health Organization. Drug and Therapeutics Committees - A Practical Guide. Geneva: World Health Organization; 2003 [cited 2011 Feb 11]. Available from: <http://apps.who.int/medicinedocs/pdf/s4882e/s4882e.pdf>
- 24 Bruneton C. Créer ou renforcer le comité du médicament dans un hôpital. *Méd Trop*. 2006;66:569-572
- 25 Briggs GG, Wan SR. Drug therapy during labor and delivery, part 1. *Am J Health Syst Pharm*. 2006 Jun 1;63(11):1038-47.
- 26 “Matri Surakchya Chakki (MSC)” for the prevention of bleeding (postpartum hemorrhage) at home births [Presentation]. Family Health Division, Department of Health Services, Ministry of Health and Population, Nepal CRS Company, Nepal Fertility Care Center and Venture Strategies for Health and Development (USA); 2009 [cited 2011 Feb 11]. Available from: <http://www.crs.org.np/userfiles/files/332e6misoprostol.ppt>

- 27 Washington State Department of Health. Guidelines for Management of HIV+ Pregnant Women Birthing in Washington State Hospitals. Olympia (WA): Washington State Department of Health; 2010 [cited 2011 Feb 11]. Available from: [http://here.doh.wa.gov/materials/hospital-checklist-HIV-pregnancy/15\\_HospitalCklst\\_E10L.pdf](http://here.doh.wa.gov/materials/hospital-checklist-HIV-pregnancy/15_HospitalCklst_E10L.pdf)
- 28 World Health Organization. PMTCT strategic vision 2010–2015: preventing mother-to-child transmission of HIV to reach the UNGASS and Millennium Development Goals. Geneva: World Health Organization; 2010 [cited 2011 Feb 11]. Available from: [http://www.who.int/hiv/pub/mtct/strategic\\_vision.pdf](http://www.who.int/hiv/pub/mtct/strategic_vision.pdf)
- 29 Kenya: Mother-baby packs to reduce HIV transmission [internet]. PlusNews. 2010 Oct 29 [cited 2011 Feb 11]. Available from: <http://www.plusnews.org/Report.aspx?ReportId=90923>
- 30 Department of Health. Annual Report 2009/2010. Pretoria: Department of Health of South Africa; 2010 [cited 2011 Feb 11]. Available from: <http://www.doh.gov.za/docs/reports/annual/2010/section1a.pdf>. Section 1: performance review; p. 34.
- 31 Lande RE, Blackburn R. Teaching pharmacists about family planning. *Popul Rep J*. 1989 Nov;(37): 20-6.
- 32 United Nations Department of Economic and Social Affairs - Population Division. Levels and Trends of Contraceptive Use as Assessed in 2002. New York (NY): United Nations, 2006 [cited 2011 Feb 11]. Available from: [http://www.un.org/esa/population/publications/wcu2002/WCU2002\\_Report.pdf](http://www.un.org/esa/population/publications/wcu2002/WCU2002_Report.pdf)
- 33 Hagen C, Fikree F, Sherali A, Hoodbhoy F. Fertility and Family Planning Trends in Karachi, Pakistan. *International Family Planning Perspectives*. 1999;25(1):38-43.
- 34 Richman AR, Daley EM. Exploring emergency contraception knowledge among Florida pharmacy school students: a preliminary assessment. *Womens Health Issues*. 2009 Nov-Dec; 19(6):373-80. Epub 2009 Oct 1.
- 35 Taylor B. The role of the pharmacist in emergency contraception. *J Fam Plann Reprod Health Care*. 2003 Apr;29(2):7.
- 36 National Statistics. Greater use of pharmacies to access the ‘morning after pill’ [News release]. London: National Statistics; 2005 Oct 28 [cited 2011 Feb 11]. Available from: [www.statistics.gov.uk/pdfdir/map1005.pdf](http://www.statistics.gov.uk/pdfdir/map1005.pdf)
- 37 Boggess JE. How Can Pharmacies Improve Access to Emergency Contraception? *Perspect Sex Reprod Health*. 2002 May-Jun;34(3):162-5.
- 38 Weir E. Emergency contraception: a matter of dedication and access. *CMAJ*. 2001 Oct;165(8):1095.
- 39 Blanchet F, Velot V, Dreux C. Initiatives to support French community pharmacists in the dispensing of emergency contraception. Poster presented at: 64th FIP Annual Congress, New Orleans (USA): 2004 Sep [cited 2011 Feb 11]. Available from: [www.cespharm.fr/fr/content/download/5082/91939/version/1/file/poster-fip-contraception-urgence.pdf&ei=RNRLTda0l8SaOo7J9fYP&usq=AFQjCNGH-IH2gf3R2Tqjb9-8vDNhI2-zPQ](http://www.cespharm.fr/fr/content/download/5082/91939/version/1/file/poster-fip-contraception-urgence.pdf&ei=RNRLTda0l8SaOo7J9fYP&usq=AFQjCNGH-IH2gf3R2Tqjb9-8vDNhI2-zPQ)
- 40 Sociedad Española de Contracepción. Unas 600.000 píldoras del día después vendidas sin receta en farmacias [media release]. Madrid: Sociedad Española de Contracepción; 2010 Sep 17. [cited 2011 Jun 17]. Available from: <http://www.sec.es/prensa/noticias/2010.09.17.php>
- 41 Moreau C, Bajos N, Trussell J. The impact of pharmacy access to emergency contraceptive pills in France. *Contraception*. 2006 Jun;73(6):602-8. Epub 2006 Mar 29.

- 42 Lewington G, Marshall K. Access to emergency hormonal contraception from community pharmacies and family planning clinics. *Br J Clin Pharmacol* 2006 May;61(5):605-8.
- 43 Hayes M, Hutchings J, Hayes P. Reducing Unintended Pregnancy by Increasing Access to Emergency Contraceptive Pills. *Matern Child Health J* 2000;4(3):203-8.
- 44 Marciante KD, Gardner JS, Veenstra DL, Sullivan SD. Modeling the Cost and Outcomes of Pharmacist-Prescribed Emergency Contraception. *Am J Public Health* 2001;91:1443-5.
- 45 Guilbert E. Portrait statistique de l'avortement au Québec [Lecture notes]. Vingt ans après l'arrêt Morgentaler, où en sommes-nous?, Institut National de la Recherche Scientifique (Quebec, Canada); presentation given on 2010 Feb 3 [cited 2011 Feb 11]. Available from: <http://partenariat-familles.inrs-ucs.quebec.ca/DocsPDF/SeminaireIVGFevrier2009.ppt>
- 46 Anderson C. Health promotion in community pharmacy: the UK situation. *Patient Educ Couns*. 2000;39:285-91.
- 47 Colegio Oficial de Farmacéuticos de Cádiz. Toma Ácido Fólico [Patient leaflet]. Cádiz: COF de Cádiz; 2007 [cited 2011 Feb 11]. Available from: <http://www.elsevier.es/ficheros/images/3/3v21n03/grande/3v21n03-13100387fig07.jpg>
- 48 El Colegio pone en marcha una campaña de prevención de los defectos del tubo neural. *Farmacéuticos*, 2007;319:26 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/7ABAC97E4B17CB42C125728800393F03/\\$File/26.AI%20d%C3%ADa%20Colegios.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/7ABAC97E4B17CB42C125728800393F03/$File/26.AI%20d%C3%ADa%20Colegios.pdf)
- 49 Makrides M, Gibson RA, McPhee AJ, Yelland L, Quinlivan J, Ryan P; DOMInO Investigative Team. Effect of DHA supplementation during pregnancy on maternal depression and neurodevelopment of young children: a randomized controlled trial. *JAMA*. 2010 Oct 20;304(15):1675-83.
- 50 Milunsky A, Jick H, Jick SS, Bruell CL, MacLaughlin DS, Rothman KJ, Willett W. Multivitamin/folic acid supplementation in early pregnancy reduces the prevalence of neural tube defects. *JAMA*. 1989 Nov 24;262(20):2847-52.
- 51 Pharmacy Guild of Australia. The Roadmap: The Strategic Direction for Community Pharmacy - Program Templates C: Maternal and infant services. Canberra: Pharmacy Guild of Australia; 2010 [cited 2011 Feb 11]. Available from: <http://www.guild.org.au/uploadedfiles/National/Public/C8%20Maternal%20and%20infant%20services%20FINAL.pdf>
- 52 Associação Nacional das Farmácias. Gripe A – Para grávidas, mães e crianças mais protegidas [Patient leaflet]. Lisbon: Associação Nacional das Farmácias; 2009 Dec.
- 53 Vaccine Fears: What is the Pharmacist's Role? [Blog certified HON]. 2010 Mar 5 [cited 2011 Feb 11]. Available from: <http://sciencebasedpharmacy.wordpress.com/2010/03/05/vaccine-fears-what-is-the-pharmacists-role/>
- 54 British Columbia Ministry of Health Services – Pharmaceutical Services Division. Vaccination Resource Package for Pharmacists. Vancouver (BC): British Columbia Ministry of Health Services – Pharmaceutical Services Division; 2009 [cited 2011 Feb 11]. Available from: [www.health.gov.bc.ca/pho/pdf/PSD-VRP.pdf](http://www.health.gov.bc.ca/pho/pdf/PSD-VRP.pdf)

- 55 Coverage of Publicly-funded vaccinations *in* H1N1 Flu virus information – Update #1: antivirals and vaccinations. BC PharmaCare Newsletter. 2009 Oct 30:09(015):6-7 [cited 2011 Feb 11]. Available from: <http://www.health.gov.bc.ca/pharmacare/newsletter/09-015news.pdf>
- 56 Rosenbluth SA, Madhavan SS, Borker RD, Maine LL. Pharmacy immunization partnerships: a rural model. *J Am Pharm Assoc*. 2001 Jan-Feb;41(1):100-7.
- 57 McKibben LJ, Stange PV, Sneller VP, Strikas RA, Rodewald LE; Advisory Committee on Immunization Practices. Use of standing orders programs to increase adult vaccination rates. *MMWR Recomm Rep*. 2000;49:15-26.
- 58 Naleway AL, Smith WJ, Mullooly JP. Delivering influenza vaccine to pregnant women. *Epidemiol Rev*. 2006; 28:47-53.
- 59 Community Pharmacy Wales. The Community Pharmacy Wales response to the Welsh Assembly Government Consultation Document Sexual Health and Wellbeing for Wales, 2009-2014: Draft Working Paper. Cardiff: Community Pharmacy Wales; 2009 Sep [cited 2011 Feb 11]. Available from: [www.cpwales.org.uk/Consultations/CPW-response-Sexual-Health-and-Wellbeing.aspx](http://www.cpwales.org.uk/Consultations/CPW-response-Sexual-Health-and-Wellbeing.aspx)
- 60 Vacinação Contra Infecções por Papilomavírus Humano na Farmácia - GUIA PRÁTICO (1<sup>st</sup> edition). Lisbon: Associação Nacional das Farmácias; 2009.
- 61 Ordre national des pharmaciens. Recommandations de gestion des produits de santé soumis à la chaîne du froid entre +2°C et +8°C à l'officine – édition de décembre 2009. Paris: Ordre national des pharmaciens 2009 [cited 2011 Feb 11]. Available from: <http://www.ordre.pharmacien.fr/upload/Syntheses/314.pdf>
- 62 Picardo C, Ferreri S. Pharmacist-administered subcutaneous depot medroxyprogesterone acetate: a pilot randomized controlled trial. *Contraception*. 2010 Aug;82(2):160-7. Epub 2010 Feb 19.
- 63 Nepal CRS Company. SANGINI (Depo-Provera): Three Monthly Injectable contraceptives (DMPA) through Pharmacies in Nepal [Internet]. Nepal CRS Company; 2011 [cited 2011 Feb 11]. Available from: <http://www.crs.org.np/sangini>
- 64 Farris KB, Ashwood D, McIntosh J, DiPietro NA, Maderas NM, Landau SC, Swegle J, Solemani O. Preventing unintended pregnancy: pharmacists' roles in practice and policy via partnerships. *J Am Pharm Assoc*. 2010 Sep-Oct;50(5):604-12.
- 65 Article L. 5125-23-1 du Code de la Santé Publique [cited 2011 Feb 11]. Available from: <http://www.legifrance.gouv.fr/affichCodeArticle.do?idArticle=LEGIARTI000020892633&cidTexte=LEGITEX T000006072665&dateTexte=20100604>
- 66 Cespharm. Campagne contraception pour les adolescents [Internet]. Paris: Cespharm; 2010 Apr 9 [cited 2011 Feb 11]. Available from: <http://www.cespharm.fr/fr/Prevention-sante/Actualites/2010/Campagne-contraception-pour-les-adolescents>
- 67 Gharat MS. Role of Community Pharmacists' in Tuberculosis Medicine Management - Initiatives in Mumbai. Presentation at: the 2009 FIP Congress; 2009 Sep 5; Istanbul, Turkey.
- 68 American Pharmacists Association. Guidance on Proper Medication Disposal. Washington DC: American Pharmacists Association; 2007 [cited 2011 Feb 11]. Available from: [www.pharmacist.com/AM/Template.cfm?Section=News\\_Releases2&template=/CM/ContentDisplay.cfm&ContentID=12267](http://www.pharmacist.com/AM/Template.cfm?Section=News_Releases2&template=/CM/ContentDisplay.cfm&ContentID=12267)

- 69 Nathan A, Goodyer L, Lovejoy A, Rashid A. 'Brown bag' medication reviews as a means of optimizing patients' use of medication and of identifying potential clinical problems. *Fam Pract*. 1999 Jun;16(3):278-82.
- 70 SIGRE. Farmacias - Puntos SIGRE en España [Internet]. Madrid: SIGRE; 2009 [cited 2011 Feb 11]. Available from: <http://www.sigre.es/Farmacias/Puntos-SIGRE-en-Espa%C3%B1a/>
- 71 ValorMed. Papel dos Profissionais [Internet]. Lisbon: ValorMed; 2011 [cited 2011 May 13]. Available from: [http://www.valormed.pt/index.php?option=com\\_content&view=article&id=176&Itemid=114](http://www.valormed.pt/index.php?option=com_content&view=article&id=176&Itemid=114)
- 72 Portes M. The pharmacist should play an active role in family planning. *Familia*. 1983 Jul-Dec;1(1):31-4
- 73 Maderas NM, Landau SC, Taylor-McGhee B. The continuum of care: a case for pharmacists as key members of the reproductive health care team. *Contraception*. 2008 Mar;77(3):139-42. Epub 2008 Jan 30.
- 74 INPES and Assurance Maladie. Comportement, attitude et rôle des médecins et des pharmaciens dans la prévention et l'éducation pour la santé [press kit]. Paris: INEPS and Assurance Maladie; 2005 Apr 28 [cited 2011 Feb 11]. Available from: [www.inpes.sante.fr/70000/dp/05/dp050428.pdf](http://www.inpes.sante.fr/70000/dp/05/dp050428.pdf)
- 75 Egger M, Low N, Smith GD, Lindblom B, Herrmann B. Screening for Chlamydial infections in the risk of ectopic pregnancy in a county in Sweden: ecological analysis. *BMJ*. 1998; 316:1776-80.
- 76 Baraitser P, Pearce V, Holmes J, Horne N, Boynton PM. Chlamydia testing in community pharmacies: evaluation of a feasibility pilot in south east London. *Qual Saf Health Care*. 2007;16:303-7.
- 77 Gudka S, Lewis M, Creagh A, Clifford R. To develop a best practice community pharmacy chlamydia screening model. Canberra: The Pharmacy Guild of Australia [cited 2011 Feb 11]. Available from: [http://www.guild.org.au/research/4cpa\\_project\\_display.asp?id=1855](http://www.guild.org.au/research/4cpa_project_display.asp?id=1855)
- 78 Fortney J, Smith J. Measuring maternal mortality. In: Bere M, Ravindran T, eds. *Safe motherhood initiatives: critical issues*. Oxford: Blackwell Science for Reproductive Health Matters; 1999.
- 79 Morin KH. Perinatal outcomes of obese women: a review of the literature. *J Obstet Gynecol Neonatal Nurs*. 1998;27:431-40.
- 80 Tanzi M. Counseling pearls for pregnant, breastfeeding women. *Pharmacy Today*. 2010 Feb;18.
- 81 Zéro alcool pendant la grossesse : indispensable mais pas suffisant... *Lettre des Nouvelles Pharmaceutiques*. 2007 Oct 18;347:12.
- 82 Pellerin P, Elefant E. Un rôle difficile pour le pharmacien d'officine, le conseil en matière de médicament et grossesse. *Ann Pharm Fr*. 2004 Jul;62(4):253-9.
- 83 Ragland D, Payakachat N, Hays EB, Banken J, Dajani NK, Ott RE. Depression and diabetes: Establishing the pharmacist's role in detecting comorbidity in pregnant women. *J Am Pharm Assoc*. 2010;50(2):195-9.
- 84 Evans E, Patry R. Management of gestational diabetes mellitus and pharmacists' role in patient education. *Am J Health Syst Pharm*. 2004 Jul 15;61(14):1460-5.



- 85 National Institute for Health and Clinical Excellence. Dietary interventions and physical activity interventions for weight management before, during and after pregnancy. London: National Institute for Health and Clinical Excellence; 2010 [cited 2011 Feb 11]. Available from: <http://www.nice.org.uk/nicemedia/live/13056/49926/49926.pdf>
- 86 NHS Grampian. Protocol for Midwives working within NHS Grampian for the Issue of Nicotine Replacement Therapy to Aid Smoking Cessation Attempts. Aberdeen: NHS Grampian; 2009 [cited 2011 Feb 11]. Available from: [http://www.nhsgrampian.org/grampianfoi//files/NRT\\_MW\\_328\\_1209.pdf](http://www.nhsgrampian.org/grampianfoi//files/NRT_MW_328_1209.pdf)
- 87 Goeser AL. Postpartum Depression. US Pharm. 2008;33(11):16-20 [cited 2011 Feb 11]. Available from: <http://www.uspharmacist.com/content/d/featured%20articles/c/11466/>
- 88 Ronai C, Scott Taylor J, Dugan E and Feller E. The Identifying and Counseling of Breastfeeding Women by Pharmacists. Breastfeeding Medicine. 2009 Jun;4(2):91-5.
- 89 Takagi K, Onda M, Iwaki A, Nishikawa N, Arakawa Y. A survey on the attitudes of pregnant and lactating women about the use of drugs. Yakugaku Zasshi. 2010 Oct;130(10):1381-5 [cited 2011 Feb 11]. Available from: [http://www.jstage.jst.go.jp/article/yakushi/130/10/1381/\\_pdf](http://www.jstage.jst.go.jp/article/yakushi/130/10/1381/_pdf)
- 90 Anderson C, Rajyaguru R. The role of community pharmacists and medicines counter assistants in health promotion: Reflections from a folic acid campaign. Int J Pharm Pract. 2002;10(1):17-22.
- 91 Babb VJ, Babb J. Pharmacist involvement in Healthy People 2010. J Am Pharm Assoc. 2003 Jan-Feb;43(1):56-60.
- 92 World Health Organization. The World Health Report- Make every mother and child count. Geneva: World Health Organization; 2005 [cited 2011 Feb 11]. Available from: [http://www.who.int/whr/2005/whr2005\\_en.pdf](http://www.who.int/whr/2005/whr2005_en.pdf)
- 93 National Institute for Health and Clinical Excellence. Improving the nutrition of pregnant and breastfeeding mothers and children in low-income households. London: National Institute for Health and Clinical Excellence; 2008 [cited 2011 Feb 11]. Available from: <http://www.nice.org.uk/nicemedia/pdf/PH011guidance.pdf>
- 94 Smolarek, RA. Family Planning and HIV+: A Review of the Guidelines and the Ethical Considerations of a Pharmacist [Internet]. Pharmacy Ethics [cited 2011 Feb 11]. Accessed from: <http://rxethics.org/smolarek.pdf>
- 95 Odunfa OO. Standard Operating Guidelines for pharmacists working at the Pharmaceutical Care-HIV patients partnership initiative clinic. Abeokuta (Nigeria): Drug Information Service Unit, Pharmacy Department, Federal Medical Centre; 2006.
- 96 Raebel MA, Chester EA, Brand DDW et al. Imbedding Research in Practice to Improve Medication Safety. Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 4: Technology and Medication Safety). Henriksen K, Battles JB, Keyes MA, et al., eds. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Aug.
- 97 Audrey SM. Nurses and Pharmacists: A Prescription for Improved Patient Care. MCN Am J Matern Child Nurs. 1997 Jul-Aug;22(4):226.

- 98 De Jong van den Berg LT, Feenstra N, Sorensen HT, Cornel MC. Improvement of drug exposure data in a registration of congenital anomalies. Pilot-study: pharmacist and mother as sources for drug exposure data during pregnancy. EuroMAP Group. European Medicine and Pregnancy Group. *Teratology*. 1999 Jul;60(1):33-6.
- 99 Anderson GD. Using pharmacokinetics to predict the effects of pregnancy and maternal-infant transfer of drugs during lactation. *Expert Opin Drug Metab Toxicol*. 2006;2(6):947-60.
- 100 Lim JM, Sullivan E, Kennedy D. MotherSafe: review of three years of counselling by an Australian Teratology Information Service. *Aust N Z J Obstet Gynaecol*. 2009 Apr;49(2):168-72.
- 101 New South Wales Health Department. Mothersafe [Internet]. Sydney: New South Wales Health Department; 2010 [cited 2011 Feb 11]. Available from: <http://www.mothersafe.org.au/>
- 102 Young S, Ali SM, Beckham S. The potential role of private pharmacies in maternal iron supplementation in rural Tanzania. *Food Nutr Bull*. 2009 Mar; 30(1):16-23.
- 103 Hall K, Wilgosh C, eds. 2007/08 Hospital Pharmacy in Canada Report. Toronto: Eli Lilly; 2008 [cited 2011 Feb 11]. Available from: [http://www.lillyhospitalsurvey.ca/hpc2/content/2008\\_report/2007\\_08\\_full.pdf](http://www.lillyhospitalsurvey.ca/hpc2/content/2008_report/2007_08_full.pdf)
- 104 Skallis S, Ferreira E, Bussieres JF, Allenet B. Pharmaceutical care in obstetrics-gynecology: a case report. *Pharmacien Hospitalier*. 2010 Sept;45(3):117-23.
- 105 Buabeng KO. The Role of the Pharmaceutical Sector in Malaria Control in Ghana [thesis]. Kuopio: Faculty of Health Sciences, University of Eastern Finland; 2010 [cited 2011 Feb 11]. Available from: [http://epublications.uef.fi/pub/urn\\_isbn\\_978-952-61-0015-9/urn\\_isbn\\_978-952-61-0015-9.pdf](http://epublications.uef.fi/pub/urn_isbn_978-952-61-0015-9/urn_isbn_978-952-61-0015-9.pdf)
- 106 Department of Health, Social Services and Public Safety. Northern Ireland Guidelines for antenatal, intrapartum and postpartum care of HIV positive women and management of the HIV-exposed infant. Belfast: Department of Health, Social Services and Public Safety; 2009 [cited 2011 Feb 11]. Available from: [http://www.dhsspsni.gov.uk/hiv\\_pregnancy\\_guidelines.pdf](http://www.dhsspsni.gov.uk/hiv_pregnancy_guidelines.pdf)
- 107 Hirsch JD, Rosenquist A, Best BM, Miller TA, Gilmer TP. Evaluation of the first year of a pilot program in community pharmacy: HIV/AIDS medication therapy management for Medi-Cal beneficiaries. *J Manag Care Pharm*. 2009 Jan-Feb;15(1):32-41.
- 108 Navti O, Venkitaraman U, Kalathy V, Nakade M, Jethwa M, Boon L, Qualie L, Dhar J, Khare M. Impact of dedicated multidisciplinary team on management of pregnant HIV-positive women at a large UK teaching hospital. *In*: Gazzard B, Lundgren J, editors. Abstracts of the 15th Annual Conference of the British HIV Association; 2009 Apr 1-3; Liverpool, United Kingdom. Oxford: Blackwell Publishing Ltd.; 2009. P. 27 [cited on 2011 Feb 11]. Available from: [http://www.bhiva.org/documents/Conferences/Liverpool2009/hiv\\_10\\_s1.pdf](http://www.bhiva.org/documents/Conferences/Liverpool2009/hiv_10_s1.pdf)
- 109 Rosenquist A, Best BM, Miller TA, Gilmer TP, Hirsch JD. Medication therapy management services in community pharmacy: a pilot programme in HIV specialty pharmacies. *J Eval Clin Pract*. 2010 Dec;16(6):1142-6.
- 110 Navti O, Venkitaraman U, Kalathy V, Nakade M, Jethwa M, Boon L, Qualie J, Dhar J, Khare M. Impact of dedicated multidisciplinary team on management of pregnant HIV-positive women at a large UK teaching hospital. Poster presented at: the 15th Annual Conference of the British HIV Association; 2009 Apr 1-3; Liverpool (United Kingdom) [cited 2011 Jun 20]. Available from [http://www.bhiva.org/documents/Conferences/Liverpool2009/hiv\\_10\\_s1.pdf](http://www.bhiva.org/documents/Conferences/Liverpool2009/hiv_10_s1.pdf)



- 111 Boruett P, Opiyo NA, Marond BO. Drug Use Evaluation: Antibiotic Prophylaxis in C-Section at the Mater Hospital [presentation]. Presentation at: National Symposium of the Hospital Pharmacists Association of Kenya; 2007 Mar; Nairobi, Kenya [cited 2011 Feb 11]. Available from: [http://erc.msh.org/dtc/powerpoint/kenya2007/drug\\_use\\_evaluation\\_poster.ppt](http://erc.msh.org/dtc/powerpoint/kenya2007/drug_use_evaluation_poster.ppt)
- 112 Laine C, Newschaffer CJ, Zhang D, Cosler L, Hauck WW, Turner BJ. Adherence to antiretroviral therapy by pregnant women infected with human immunodeficiency virus: a pharmacy claims-based analysis. *Obstet Gynecol.* 2000 Feb;95(2):167-73.
- 113 Akre J. The pharmacist's role in promoting healthy infant feeding. *International Pharmacy Journal.* 1999;13(1):12-13.
- 114 Sidaction. Grandir - Breastfeeding, Not necessarily self-evident. Paris: Sidaction [cited 2011 Feb 11]. Available from: [www.grandir.sidaction.org/ressources/fichepratique/factsheets/factsheet8breastfeeding.pdf](http://www.grandir.sidaction.org/ressources/fichepratique/factsheets/factsheet8breastfeeding.pdf)
- 115 Gupta U, Sharma S, Sheth PD, Jha J, Chaudhury RR. Improving medicine usage through patient information leaflets in India. *Trop Doct.* 2005 Jul;35(3):164-6.
- 116 Colegio Oficial de Farmacéuticos de A Coruña. Medicamentos anticonceptivos. Dudas? [Internet]. 2008 [cited on 2011 Feb 11]. Available from: <http://www.cofc.es/servicios/libre/campanyas/campanya.aspx?idcamp=17>
- 117 Colegio Oficial de Farmacéuticos de Ciudad Real. El Colegio de Farmacéuticos de C.Real presentó su nueva campaña sobre información de métodos anticonceptivos [media Release]. Ciudad Real: Colegio Oficial de Farmacéuticos de Ciudad Real; 2009 Jul 14 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/D3AF14769E5AEF54C12575FC003A1C23/\\$FILE/Campania\\_anticonceptivos.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/D3AF14769E5AEF54C12575FC003A1C23/$FILE/Campania_anticonceptivos.pdf)
- 118 Associação Nacional das Farmácias. Contraceção – Sexualidade sem sobressaltos [patient leaflet]. Lisbon: Associação Nacional das Farmácias; 2007 Jun.
- 119 Præventionskampagne på apoteket. *Farmaci.* 2009;8:24-5 [cited 2011 Feb 11]. Available from: <http://infolink2003.elbo.dk/apotekerforeningen/dokumenter/doc/9392.pdf>
- 120 Associação Nacional das Farmácias. Pílula do dia seguinte. Só para emergências [patient leaflet]. Lisbon: Associação Nacional das Farmácias; 2007 Jun.
- 121 Associação Nacional das Farmácias. Prevenção da gravidez indesejada. Guia para os farmacêuticos de intervenção sobre os medicamentos sem receita médica [protocol for pharmacists]. Lisbon: Associação Nacional das Farmácias; 2005.
- 122 Gainer E, Blum J, Toverud EL, Portugal N, Tyden T, Nesheim BI, Larsson M, Vilar D, Nymoen P, Aneblom G, Lutwick A, Winikoff B. Bringing emergency contraception over the counter: experiences of nonprescription users in France, Norway, Sweden and Portugal. *Contraception.* 2003 Aug;68(2):117-24.
- 123 Serfaty D. Oral contraceptive compliance during adolescence. *Ann N Y Acad Sci.* 1997 Jun 17;816:422-31.
- 124 Nordeng H, Ystrom E, Einarson A. Perception of risk regarding the use of medications and other exposures during pregnancy. *Eur J Clin Pharmacol* 2010 Feb;66(2):207-14.
- 125 Thacker S and Petkevicz K. Gestational Diabetes Mellitus: Pharmacist's Role. *US Pharmacist.* 2009;34(9):43-8.

- 126 Sleath BL, Jackson E, Thomas KC, et al. Literacy and perceived barriers to medication taking among homeless mothers and their children. *Am J Health Syst Pharm*. 2006 Feb 15;63(4):346-51.
- 127 INPES. Grossesse et accueil de l'enfant – Outil d'intervention en éducation pour la santé des femmes enceintes [online]. Paris: INPES; 2010 Sep 28 [cited 2011 Feb 11]. Available from: <http://www.inpes.sante.fr/index2.asp?page=professionnels-sante/outils/grossesse-accueil.asp>
- 128 Macartney S, Whyte M. New moms and self medication. *Can Nurse*. 1995 Oct;91(9):47-8.
- 129 Arpin M, Goulet G, Goldberg F, Vaillancourt R. Évaluation du contrôle de la douleur ainsi que de la satisfaction du personnel infirmier et des mères à la suite de l'implantation d'un programme d'automédication en obstétrique. *Can J Hosp Pharm*. 2007 February;60(1):19-27.
- 130 Prot-Labarthe S. Le pharmacien hospitalier et la pratique clinique - Comparaison française et québécoise au sein de deux hôpitaux pédiatriques [PharmD thesis]. Paris: Université Paris Descartes; 2007.
- 131 Jayawickrama HS, Amir LS and Pirotta MV. GPs' decision-making when prescribing medicines for breastfeeding women: Content analysis of a survey. *BMC Res Notes*. 2010 Mar 23;3:82 [cited 2011 Feb 11]. Available from: <http://www.biomedcentral.com/1756-0500/3/82>
- 132 Jeng LL, Moore RM, Kaczmarek RG, Placek PJ, Bright RA. How Frequently Are Home Pregnancy Tests Used? Results from the 1988 National Maternal and Infant Health Survey. *Birth*. 1991 March;18(1):11-3.
- 133 Gossel TA. Home testing products for self-monitoring. *Am J Hosp Pharm*. 1988 May;45(5):1119-26.
- 134 Scolaro KL, Lloyd KB, Helms KL. Devices for home evaluation of women's health concerns. *Am J Health Syst Pharm*. 2008 Feb 15;65(4):299-314.
- 135 National Association of Pharmacy Regulatory Authorities. Model Standards of Practice for Canadian Pharmacists. Ottawa: National Association of Pharmacy Regulatory Authorities; 2003 [cited 2011 Feb 11]. Available from: [http://cpe.pharmacy.dal.ca/Files/model\\_standards\\_of\\_practice\\_for\\_Canadian\\_Pharmacists.pdf](http://cpe.pharmacy.dal.ca/Files/model_standards_of_practice_for_Canadian_Pharmacists.pdf)
- 136 Canadian Council on Continuing Education in Pharmacy. CCCEP Accredited Programs [Internet]. Regina (SK): Canadian Council on Continuing Education in Pharmacy [cited 2011 Feb 11]. Available from: [http://www.cccep.ca/index\\_content.php?id=75](http://www.cccep.ca/index_content.php?id=75)
- 137 Accreditation Council for Pharmacy Education. P.L.A.N. Search [Internet]. Chicago (IL): Accreditation Council for Pharmacy Education, 2011 [cited 2011 Feb 11]. Available from: <http://www.acpe-accredit.org/>
- 138 Moles R. Breastfeeding and lactation aids [unpublished lecture notes]. Workshop on Breastfeeding and lactation aids, Pharmaceutical Society of Australia; lecture given 2010.
- 139 Pharmaceutical Society of Australia. 2010 Regional CPD Program [internet]. Sydney: Pharmaceutical Society of Australia; 2010 [cited 2011 Feb 11]. Available from: <http://www.psa.org.au/site.php?id=6452>
- 140 NHS Scotland. Medicines & Mothers – Challenges in Breastfeeding [Online course]. Edinburgh: NHS Scotland; 2011 [cited 2011 May 13]. Available from: <http://www.nes.scot.nhs.uk/breastfeeding/start.html>
- 141 Consejo General de Colegios Oficiales de Farmacéuticos. Medicamentos en embarazo, madres lactantes, niños y ancianos. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 1991.

- 142 Colegio Oficial de Farmacéuticos de Madrid. Alimentación infantil en la oficina de farmacia (Acreditado por la Comisión de Formación Continuada del Sistema Nacional de Salud, 4,7 Créditos) [Internet]. Madrid: Colegio Oficial de Farmacéuticos de Madrid; 2010 [cited 2011 Feb 11]. Available from: [http://www.grupoargon.com/cofm/presentacion.php?\\_cursoid=1](http://www.grupoargon.com/cofm/presentacion.php?_cursoid=1)
- 143 Plan nacional de formación continuada - Avances en farmacología y farmacoterapia [Internet]. Farmacéuticos 2002 Feb; 260: 24 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/8D29E6E6370A3FFCC1256C10003A1C2B/\\$File/formacion.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/8D29E6E6370A3FFCC1256C10003A1C2B/$File/formacion.pdf)
- 144 Raposo Simón C, Megía Arias C, Núñez Parrilla M. Medicamentos en circunstancias especiales *in* Avances en farmacología y farmacoterapia. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2002.
- 145 Pharmacists Council of Nigeria. Advances in Clinical Pharmacology & Toxicology: Treatment and Management of common clinical disorders; Gynaecological disorders in Mandatory Continuing Professional Education Programme for Recertification of Pharmacists. Abuja: Pharmacists Council of Nigeria; 2000 [Code PCN/E/4], page 6.
- 146 Pharmacists Council of Nigeria. Public Health Pharmacy: Health Education and the Pharmacist in Relation to alcohol, child care, birth control and family planning, vaccination, dental and mental health *in* Mandatory Continuing Professional Education Programme for Recertification of Pharmacists. Abuja: Pharmacists Council of Nigeria; 2000 [Code PCN/C/6], page 4.
- 147 Pharmacists Council of Nigeria. Public Health Pharmacy: Diseases of Public Health Importance - Children's Six Killer Diseases; Recent Drugs of choice in the treatment of the identified diseases *in* Mandatory Continuing Professional Education Programme for Recertification of Pharmacists. Pharmacists Council of Nigeria; 2005 [Code PCN/C/1/(i)], page 8.
- 148 Fernández CA. Desafíos y logros de la Confederación Farmacéutica Argentina. *Correo Farmacéutico*. 2009 Jun; 18(91): 6-7 [cited 2011 Feb 11]. Available from: <http://www.cofa.org.ar/CorreoFarmaceutico/CORREO91.pdf>
- 149 Cursos na Plataforma - Cursos disponíveis na Plataforma e-Learning [website]. Lisbon: Escola de Pós-graduação em Saúde e Gestão; 2011 [cited 2011 Jun 7]. Available from: <http://www.escolasaudegestao.pt/faces/conteudo.jsp?i=227>
- 150 Royal College of Midwives. Welsh midwife and pharmacists win JOHNSON'S® Baby Award for Excellence in Midwifery Education [media release]. London: Royal College of Midwives; 2011 Feb 2 [cited 2011 Feb 11]. Available from: <http://www.rcm.org.uk/college/about/media-centre/press-releases/rcm-midwifery-awards-spotlight-value-of-midwifery-care-25-01-11/from-east-anglia-to-the-west-bank-student-midwife-wins-national-midwifery-award-28-01-11/welsh-midwife-and-pharmacists-win-johnsons-baby-award-for-excellence-in-midwifery-education-01-02-11/>
- 151 International Pharmaceutical Federation. Malaria Education Campaign [Internet]. The Hague: FIP; 2011 [cited 2011 Feb 11]. Available from: [http://www.fip.org/menu\\_malaria](http://www.fip.org/menu_malaria)
- 152 March of Dimes. Pharmacists Join Nationwide Folic Acid Campaign to Prevent Serious Birth Defects [media release]. White Plains (NY): March of Dimes; 2001 Nov 8 [cited 2011 Feb 11]. Available from: [www.marchofdimes.com/aboutus/791\\_1669.asp](http://www.marchofdimes.com/aboutus/791_1669.asp)
- 153 Spædbørn og gravide på apotekerne. *Farmaci*. 2002;4:29 [cited 2011 Feb 11]. Available from: <http://infolink2003.elbo.dk/apotekerforeningen/dokumenter/doc/8406.pdf>

- 154 National Health Services. The role of pharmacists in National Service Framework for Children Young People and Maternity Services: Medicines for children and young people: Standard 10. London: National Health Services; 2007 [cited 2011 Feb 11]. Available from: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browse/DH\\_5355019](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browse/DH_5355019)
- 155 Ghana Social Marketing Programme (GSMP). Questions to ask woman before providing oral contraceptives [Poster for healthcare professional]. Accra (Ghana): GSMP; 1986.
- 156 Association Herpès et al. Couples récents - pour que l'herpès ne vienne pas tout gâcher [patient leaflet]. Paris: Association Herpès et al; 2006 [cited 2011 Feb 11]. Available from: <http://www.reseaux-perinat-hn.com/medias/herpes.pdf>
- 157 Cespharm, Association Herpès and AP-HP. Herpès et grossesse - Guide pratique No2 [patient leaflet]. Paris: Cespharm, Association Herpès and AP-HP; 2004 [cited 2011 Feb 11]. Available from: [http://www.perinat-france.org/upload/grand-public/prevention/documents/herpes\\_grossesse.pdf](http://www.perinat-france.org/upload/grand-public/prevention/documents/herpes_grossesse.pdf)
- 158 Conseil national de l'Ordre des pharmaciens. Country report 2006-2007 to Europharm Forum. Paris: Conseil national de l'Ordre des pharmaciens; 2007.
- 159 Suomen Apteekkariliitto. Asiakasesitteet [Patient Leaflets]. Helsinki: Suomen Apteekkariliitto; 2003-2009 [cited 2011 Feb 11]. Available from: <http://www.apteekkariliitto.fi/asiakkaille/asiakasesitteet/Sivut/default.aspx>
- 160 Durand M. Le rôle du pharmacien d'officine dans l'arrêt du tabac pendant la grossesse. J Gynecol Obstet Biol Reprod (Paris). 2005 Apr;34 Spec No 1:3S336-8.
- 161 Le Maitre B, Hirsch A. Pharmacien et Tabac – Prise en charge de l'arrêt du tabac . Paris: Cespharm; 2007 May [cited 2011 Feb 11]. Available from: <http://www.cespharm.fr/fr/content/download/3337/53311/file/pharmacien-et-tabac-prise-en-charge-de-l-arret-du-tabac-fiche-technique.pdf>
- 162 Ballard P, Radley A. Give It Up For Baby: A Smoking Cessation Intervention for Pregnant Women in Scotland. Cases in Public Health Communication and Marketing. 2009;3:147-160 [cited 2011 Feb 11]. Available from: [http://www.gwumc.edu/sphhs/departments/pch/phcm/casesjournal/volume3/showcase/cases\\_3\\_09.pdf](http://www.gwumc.edu/sphhs/departments/pch/phcm/casesjournal/volume3/showcase/cases_3_09.pdf)
- 163 Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar IV [Internet]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2009 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/\\$FILE/index.htm](http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/$FILE/index.htm)
- 164 Shepherd AA. Nutrition through the life-span. Part 1: preconception, pregnancy and infancy. Br J Nurs. 2008 Nov 13-26;17(20):1261-8.
- 165 Willows ND, Iserhoff R, Napash L, Leclerc L, Verrall T. Anxiety about food supply in Cree women with infants in Quebec. Int J Circumpolar Health. 2005 Feb;64(1):55-64.
- 166 Ireland. Statutory Instruments S.I. No. 852 of 2007 - European Communities (Infant Formulae and Followon Formulae) Regulations 2007 [online; cited 2011 Feb 11]. Available from: <http://www.attorneygeneral.ie/esi/2007/B25917.pdf>

- 167 Associação Nacional das Farmácias. Leites e Fórmulas Infantis – Ajuda para Crescer [Leaflet]. Lisbon: Associação Nacional das Farmácias; 2008 Jan.
- 168 France. Article L4211-1 du Code de la Santé Publique [cited 2011 Feb 11]. Available from: <http://www.legifrance.gouv.fr/affichCodeArticle.do?idArticle=LEGIARTI000006689006&cidTexte=LEGITEX T000006072665&dateTexte=vig>
- 169 van den Brink H. La pilule du lendemain gratuite en pharmacie - aspects juridiques et pratiques. Bulletin de l'Ordre. 2002;375:283-6 [cited 2011 Feb 11]. Available from: <http://www.ordre.pharmacien.fr/upload/Syntheses/113.pdf>
- 170 Ontario College of Pharmacists. Position Statement on “Refusal to Fill for Moral or Religious Reasons”. Toronto: Ontario College of Pharmacists; 2001 [cited 2011 Feb 11]. Available from: <http://www.ocpinfo.com/client/ocp/OCPHome.nsf/d12550e436a1716585256ac90065aa1c/98948e68f8b1c6c485256af00050a94d?OpenDocument&Highlight=2,beliefs>
- 171 National Health Service Scotland. PHS Standard Operating Procedure 2 - NHS Scotland PHS Sexual Health Service-EHC Standard Operating Procedure. Edinburgh: NHS Scotland; 2008 [cited 2011 Feb 11]. Available from: [http://www.communitypharmacyscotland.org.uk/\\_resources/files/legislation/PHS%20Standard%20Operating%20Procedure%202-EHC.pdf](http://www.communitypharmacyscotland.org.uk/_resources/files/legislation/PHS%20Standard%20Operating%20Procedure%202-EHC.pdf)
- 172 Australian Health Ministers’ Conference. Australian National Breastfeeding Strategy 2010 - 2015. Canberra: Australian Health Ministers’ Conference; 2009 [cited 2011 Feb 11]. Available from: [http://www.health.gov.au/internet/main/publishing.nsf/Content/49F80E887F1E2257CA2576A10077F73F/\\$File/Breastfeeding\\_strat1015.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/49F80E887F1E2257CA2576A10077F73F/$File/Breastfeeding_strat1015.pdf)
- 173 3.000 farmacéuticos forman a mujeres en etapa preconcepcional, embarazadas y madres lactantes en hábitos alimentarios saludables. Farmacéuticos. 2009 Nov-Dec;351: 20-1 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/08E07FB892103240C12576A20035B15B/\\$File/20-21.%20Farma%20351.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/08E07FB892103240C12576A20035B15B/$File/20-21.%20Farma%20351.pdf)
- 174 Royal College of Nursing. Patient Group Directions - Guidance and information for nurses. London: Royal College of Nursing; 2004 [cited 2011 Feb 11]. Available from: [http://www.rcn.org.uk/\\_data/assets/pdf\\_file/0008/78506/001370.pdf](http://www.rcn.org.uk/_data/assets/pdf_file/0008/78506/001370.pdf)
- 175 NHS Grampian. Patient Group Direction for the initial and repeat supply of the contraceptive Progestogen Only Pill. Aberdeen: NHS Grampian; 2009 [cited 2011 Feb 11]. Available from: [http://www.nhsgrampian.org/grampianfoi/files/POP\\_314\\_0809.pdf](http://www.nhsgrampian.org/grampianfoi/files/POP_314_0809.pdf)
- 176 NHS West Sussex. Patient Group Direction for the administration of human papillomavirus vaccine. Chichester: NHS West Sussex; 2010 [cited 2011 Feb 11]. Available from: <http://www.westsussexgp.com/documents/HPV.pdf>
- 177 Alberta College of Pharmacists. Standard 6 - Pharmacist’s duties when dispensing a drug *in* Standards for Pharmacist Practice. Edmonton: Alberta College of Pharmacists; 2007 [cited 2011 Feb 11]. Available from: [https://pharmacists.ab.ca/document\\_library/HPAstds.pdf](https://pharmacists.ab.ca/document_library/HPAstds.pdf)
- 178 Nahata MC, Allen LV Jr. Extemporaneous drug formulations. Clin Ther. 2008 Nov;30(11):2112-9.

- 179 Standing JF, Tuleu C. Paediatric formulations-getting to the heart of the problem. *Int J Pharm.* 2005 Aug 26;300(1-2):56-66.
- 180 Mulholland P, Grant J, Wallace J, Tomlin S, Fisher H, Stobie S, Brailey A eds. Medication and its forms *in* Introduction to paediatric pharmaceutical care. Edinburgh: Scottish Neonatal and Paediatric Pharmacists (SNAPP); 2009 [cited 2011 Feb 11]. Available from:  
[http://www.nes.scot.nhs.uk/nes\\_resources/paediatrics/Book%20chapters/Chapter%202.pdf](http://www.nes.scot.nhs.uk/nes_resources/paediatrics/Book%20chapters/Chapter%202.pdf)
- 181 Milne CP, Bruss JB. The economics of paediatric formulation development for off-patent drugs. *Clin Therap.* 2008;30(11):2133-45.
- 182 Herrera Carranza J, Montero Torrejón JC eds. *Atención Farmacéutica en Pediatría.* Madrid: Elsevier; 2007.
- 183 Breitzkreutz J, Boos J. Paediatric and geriatric drug delivery. *Expert Opin Drug Deliv.* 2007 Jan;4(1):37-45.
- 184 Mulholland P, Grant J, Wallace J, Tomlin S, Fisher H, Stobie S, Brailey A eds. Introduction *in* Introduction to paediatric pharmaceutical care. Edinburgh: Scottish Neonatal and Paediatric Pharmacists (SNAPP); 2009 [cited 2011 Feb 11]. Available from:  
[http://www.nes.scot.nhs.uk/nes\\_resources/paediatrics/Book%20chapters/Chapter%201.pdf](http://www.nes.scot.nhs.uk/nes_resources/paediatrics/Book%20chapters/Chapter%201.pdf)
- 185 Formulário Galénico Português 2007 (vol. I and II). Lisbon: Associação Nacional das Farmácias (ANF); 2008 Mar. ISBN 978-989-8003-13-3.
- 186 Pollack A. Sugary Mix Is Just What the Flu Doctor Ordered [Internet]. *New York Times*, 2009 Oct 4 [cited 2011 Feb 11] Available from:  
[http://www.nytimes.com/2009/10/04/health/04cherry.html?\\_r=1&ref=health](http://www.nytimes.com/2009/10/04/health/04cherry.html?_r=1&ref=health)
- 187 Colombini N, Elias R, Busuttill M, Dubuc M, Einaudi M-A, Bues-Charbit M. Hospital morphine preparation for abstinence syndrome in newborns exposed to buprenorphine or methadone. *Pharm World Sci.* 2008 Jun;30(3):227-34. Epub 2007 Nov 16.
- 188 Hewetson R, Singh S. The lived experience of mothers of children with chronic feeding and/or swallowing difficulties. *Dysphagia.* 2009 Sep;24(3):322-32. Epub 2009 Mar 4.
- 189 Kayumba PC, Huyghebaert N, Cordella C, Ntawukuliryayo JD, Vervaet C, Remon JP. Quinine sulphate pellets for flexible paediatric drug dosing: formulation development and evaluation of taste-masking efficiency using the electronic tongue. *Eur J Pharm Biopharm.* 2007 Jun;66(3):460-5. Epub 2006 Dec 1.
- 190 Mulholland P, Grant J, Wallace J, Tomlin S, Fisher H, Stobie S, Brailey A eds. Nutrition *in* Introduction to paediatric pharmaceutical care. Edinburgh: Scottish Neonatal and Paediatric Pharmacists (SNAPP); 2009 [cited 2011 Feb 11]. Available from:  
[http://www.nes.scot.nhs.uk/nes\\_resources/paediatrics/Book%20chapters/Chapter14.pdf](http://www.nes.scot.nhs.uk/nes_resources/paediatrics/Book%20chapters/Chapter14.pdf)
- 191 Lam C. Pharmacy compounding – regulatory issues [internet, cited 2011 Feb 11]. Available from:  
<http://regulatory.usc.edu/documents/PharmacyCompounding.pdf>
- 192 Monedero Perales MC, Ramos Carrillo A, Herrera Carranza J. Formas Farmacéuticas Pediátricas. *Productos Sanitarios de Uso en Pediatría. Atención Farmacéutica en Pediatría.* Madrid: Elsevier; 2007 [cited 2011 Feb 11]. p.85-99. ISBN: 9788480862059. Available from:  
<http://www.diazdesantos.es/wwwdat/pdf/SP0706900519.pdf>



- 193 World Health Organization. The selection and use of essential medicines – Report of the WHO Expert Committee, 2009 (including the 16<sup>th</sup> WHO model List of Essential Medicines and the 2<sup>nd</sup> WHO Model List of Essential Medicines for Children – WHO Technical Report Series 958. Geneva: World Health Organization; 2009 [cited 2011 Feb 11]. Available from:  
[http://www.who.int/selection\\_medicines/committees/expert/17/WEB\\_TRS\\_DEC\\_2009.pdf](http://www.who.int/selection_medicines/committees/expert/17/WEB_TRS_DEC_2009.pdf)
- 194 Meiners MM, Bergsten-Mendes G. Drug prescription for hospitalized paediatric patients: how can the quality be evaluated? Rev Assoc Med Bras. 2001 Oct-Dec;47(4):332-7.
- 195 Begs SA, Cranswick NE, Reed MD. Improving drug use for children in the developing world. Arch Dis Child. 2005;90:1091-93.
- 196 Bustreo F, Harding A, Axelsson H. Can developing countries achieve adequate improvements in child health outcomes without engaging the private sector? Bull World Health Organ. 2003;81:886-895.
- 197 Associação Nacional das Farmácias. Diarreia e vômitos na criança – Bem cuidar para não desidratar. Lisbon: Associação Nacional das Farmácias; 2010 Jul.
- 198 International Pharmaceutical Federation. FIP Framework for Establishing National Guidelines for Pharmacists in Combating Counterfeit Medicines. The Hague: International Pharmaceutical Federation; 2009.
- 199 SEARPharm Forum. Report on Database on the incidents of Counterfeit medicines in the WHO-SEA Region. New Delhi: SEARPharm Forum; 2007 Dec 31.
- 200 Bogdanich W, Hooker J. From China to Panama, a Trail of Poisoned Medicine. New York Times. 2007 May 6 [cited 2011 Feb 11]. Available from:  
[http://www.nytimes.com/2007/05/06/world/06poison.html?\\_r=1&pagewanted=all](http://www.nytimes.com/2007/05/06/world/06poison.html?_r=1&pagewanted=all)
- 201 ASHP technical assistance bulletin on the pharmacist's role in immunization. Am J Hosp Pharm. 1993; 50(3):501-5
- 202 Associação Nacional das Farmácias and Museu de Farmácia. A farmácia é tua amiga. Lisbon: Associação Nacional das Farmácias and Museu de Farmácia; 2008 [cited 2011 Feb 11]. Available from:  
[http://www.anf.pt/sara/Livro\\_BD\\_Final.pdf](http://www.anf.pt/sara/Livro_BD_Final.pdf)
- 203 Hoeben BJ, Dennis MS, Bachman RL, Bhargava M, Pickard ME, Sokol KM, Vu L, Rovers JP. Role of the pharmacist in childhood immunizations. J Am Pharm Assoc. 1997 Sep-Oct;NS37(5):557-62.
- 204 Bégué P. La Vaccination – 1re partie : Principes généraux et calendrier vaccinal. Paris: Cespharm; 2009 Apr [cited 2011 Feb 11]. Available from:  
<http://www.cespharm.fr/fr/content/download/15112/320412/file/la-vaccination-1re%20partie-principes-generaux-et-calendrier-vaccinal-fiche%20technique-mise-a-jour-2010.pdf>
- 205 Isaacs D, Lawrence G, Boyd I, Ronaldson K, McEwen J. Reporting of adverse events following immunization in Australia. J Paediatr Child Health. 2005 Apr;41(4):163-6.
- 206 Madhavan SS, Rosenbluth SA, Amonkar M, Borker RD, Richards T. Pharmacists and immunizations: a national survey. J Am Pharm Assoc. 2001 Jan-Feb;41(1):32-45.

- 207 Virginia Department of Health. Protocol for the Administration of H1N1 Influenza Vaccine to Minors by Licensed Pharmacists, Registered Nurses, or Licensed Practical Nurses. Richmond: Virginia Department of Health; 2009 [cited 2011 Feb 11]. Available from: <http://www.vdh.state.va.us/epidemiology/Immunization/documents/Influenza/H1N1InfluenzaProtocolMinors.pdf>
- 208 Department of Human Services – Public Health Division. Pharmacy Immunization Information [online]. Portland (OR): Department of Human Services – Public Health Division [cited 2011 Feb 11]. Available from: <http://www.oregon.gov/DHS/ph/imm/provider/pharmpro.shtml>
- 209 Public Law, Chapter 308 LD 1233, item 1, 124<sup>th</sup> Maine State Legislature. An Act to Allow Pharmacists to Administer Certain Immunizations [cited 2011 Feb 11]. Available from: [http://www.maine.gov/pfr/professionallicensing/professions/pharmacy/pdf/LD\\_1223.pdf](http://www.maine.gov/pfr/professionallicensing/professions/pharmacy/pdf/LD_1223.pdf)
- 210 Missouri Board of Pharmacy. Review of Pharmacists Administration Regulations [online]. Jefferson City (MO): Missouri Board of Pharmacy; 2010 [cited 2011 Feb 11]. Available from: <http://pr.mo.gov/boards/pharmacy/13863%5B1%5D.pdf>
- 211 Alberta College of Pharmacists. Standard 17 - Pharmacist's duties in relation to administering an injection to a patient *in* Standards for Pharmacist Practice. Edmonton: Alberta College of Pharmacists; 2007 [cited 2011 Feb 11]. Available from: [https://pharmacists.ab.ca/document\\_library/HPAstds.pdf](https://pharmacists.ab.ca/document_library/HPAstds.pdf)
- 212 Blackburn with Darwen, Blackpool, Central Lancashire, Cumbria, East Lancashire and North Lancashire PCTs. Clinical Content of Patient Group Direction for Pneumococcal Polysaccharide Vaccine. United Kingdom: Blackburn with Darwen, Blackpool, Central Lancashire, Cumbria, East Lancashire and North Lancashire PCTs; 2009.
- 213 East Lancashire and North Lancashire PCTs. Clinical Content of Patient Group Direction for Inactivated Influenza Vaccination (Split Virus/Surface Antigen/Virosome Adjuvated Surface Antigen). United Kingdom: East Lancashire and North Lancashire PCTs; 2010.
- 214 Samad L, Tate AR, Dezateux C, Peckham C, Butler N, Bedford H. Differences in risk factors for partial and no immunisation in the first year of life: prospective cohort study. *BMJ*. 2006 Jun 3;332(7553):1312-3.
- 215 Ndiaye SM, Madhavan S, Washington ML, Shui I, Tucker J, Rosenbluth S, Richards T. The use of pharmacy immunization services in rural communities. *Public Health*. 2003 Mar;117(2):88-97.
- 216 Sidaction. Grandir - At the pharmacy: dispensing paediatric drugs and monitoring child patients. Paris: Sidaction, 2010 Mar [cited 2011 Feb 11]. Available from: [http://www.grandir.sidaction.org/ressources/fichepratique/factsheets/factsheet18at\\_the\\_pharmacydispensing\\_paediatric\\_drugs.pdf](http://www.grandir.sidaction.org/ressources/fichepratique/factsheets/factsheet18at_the_pharmacydispensing_paediatric_drugs.pdf).
- 217 Nichter M, Acuin CS, Vargas A. Introducing zinc in a diarrhoeal control programme: guide to conducting formative research. Geneva: World Health Organization; 2008 [cited 2011 Feb 11]. Available from: [http://whqlibdoc.who.int/publications/2008/9789241596473\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241596473_eng.pdf)
- 218 World Health Organization and UNICEF. Diarrhoea: Why children are still dying and what can be done. Geneva: World Health Organization and UNICEF, 2010 [cited 2011 Feb 11] Available from: [http://whqlibdoc.who.int/publications/2009/9789241598415\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241598415_eng.pdf)
- 219 Goodburn E, Mattosinho S, Mongi P, Waterston T. Management of childhood diarrhoea by pharmacists and parents: is Britain lagging behind the Third World? *BMJ*. 1991 Feb 23;302(6774):440-3.



- 220 Paul IM, Beiler JS, King TS, Clapp ER, Vallati J, Berlin CM Jr. Vapor Rub, Petrolatum, and No Treatment for Children With Nocturnal Cough and Cold Symptoms. *Pediatrics*. 2010 Dec;126(6):1092-9. Epub 2010 Nov 8.
- 221 Seidel R. Long-term Contributions to Health in a World of Short-term Commitments and Shrinking Funds: Seven Innovations. Washington DC: Academy for Educational Development 2006 [cited 2011 Feb 11]. Available from: [http://www.globalhealthcommunication.org/tool\\_docs/81/Long-term\\_Contribututions\\_-\\_Full\\_Text.pdf](http://www.globalhealthcommunication.org/tool_docs/81/Long-term_Contribututions_-_Full_Text.pdf)
- 222 Hassell K, Whittington Z, Cantrill J, Bates F, Rogers A, Noyce P. Managing demand: transfer of self-limiting conditions from general practice to community pharmacy. *BMJ*. 2001 Jul 21;323(7305):146-7.
- 223 Bronstein AC, Spyker DA, Cantilena LR Jr, Green J, Rumack BH, Heard SE. 2006 annual report of the American Association of Poison Control Centres' National Poison Data System (NPDS). *Clinical Toxicology*. 2007;45:815-917.
- 224 Peden M et al Ed. World report on child injury prevention. Geneva: WHO and UNICEF; 2008 [cited 2011 Feb 11]. Available from: [http://whqlibdoc.who.int/publications/2008/9789241563574\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241563574_eng.pdf)
- 225 Commission Sécurisation du circuit du médicament (ORMEDIMS). Procédure de traitement des alertes descendantes des spécialités pharmaceutiques. Poitiers: Commission Sécurisation du circuit du médicament (ORMEDIMS); 2008 [cited 2011 Feb 11]. Available from: [http://www.parhtage.sante.fr/re7/poc/doc.nsf/VDoc/A5B56715CF0C9DD8C1257512005396DE/\\$FILE/procedure%20de%20traitement%20des%20alertes.pdf](http://www.parhtage.sante.fr/re7/poc/doc.nsf/VDoc/A5B56715CF0C9DD8C1257512005396DE/$FILE/procedure%20de%20traitement%20des%20alertes.pdf)
- 226 Haute Autorité de Santé. Fiche thématique : Organisation du circuit du médicament en établissement de santé. Saint-Denis La Plaine (France): Haute Autorité de Santé; 2005 [cited 2011 Feb 11]. Available from: [http://www.infirmiers.com/pdf/circuit\\_medicament\\_fiche.pdf](http://www.infirmiers.com/pdf/circuit_medicament_fiche.pdf)
- 227 Pharmacy Guild of Australia. Quality Care Pharmacy Program. Canberra: Pharmacy Guild of Australia, 2006.
- 228 Child flu medicine recalled [Internet]. Johannesburg: News24com, 2009 Jun 25 [cited on 2011 Feb 11]. Available from: <http://www.news24.com/Africa/News/Child-flu-medicine-recalled-20090625>
- 229 Layton L. FDA: Plant that made Tylenol and other pediatric medicine lacked quality control [Internet]. *Washington Post*. 2010 May 5; A02 [cited 2011 Feb 11]. Available from: [http://www.washingtonpost.com/wp-dyn/content/article/2010/05/04/AR2010050403950\\_pf.html](http://www.washingtonpost.com/wp-dyn/content/article/2010/05/04/AR2010050403950_pf.html)
- 230 Shehab N, Schaefer MK, Kegler SR, Budnitz DS. Adverse events from cough and cold medications after a market withdrawal of products labeled for infants. *Pediatrics*. 2010 Dec;126(6):1100-7. Epub 2010 Nov 22.
- 231 Kaushal R, Bates DW, Landrigan C, McKenna KJ, Clapp MD, Federico F, Goldmann DA. Medication Errors and Adverse Drug Events in Pediatric Inpatients. *JAMA*. 2001 Apr 25;285(16):2114-20.
- 232 Takata GS, Mason W, Taketomo C, Logsdon T, Sharek PJ. Development, testing, and findings of a pediatric-focused trigger tool to identify medication-related harm in US children's hospitals. *Pediatrics*. 2008 Apr;121(4):e927-35.

- 233 American Academy of Pediatrics - Committee on Drugs and Committee on Hospital Care. Prevention of Medication Errors in the Pediatric Inpatient Setting [Policy Statement]. *Pediatrics*. 1998 Aug;102(2 Pt 1):428-30.
- 234 Fortescue EB, Kaushal R, Landrigan CP, McKenna KJ, Clapp MD, Federico F, Goldmann DA, Bates DW. Prioritizing Strategies for Preventing Medication Errors and Adverse Drug Events in Pediatric Inpatients. *Pediatrics*. 2003; 111(4):722-9.
- 235 Botha JH, Tyrannes I, Miller R, Wesley AG. Pharmacokinetic consultation program in a pediatric asthma clinic. *Am J Hosp Pharm*. 1992 Aug;49(8):1936-40.
- 236 Frush K, Luo X, Hutchinson P, Higgins J. Evaluation of a method to reduce over-the-counter medication dosing error. *Arch Pediatr Adolesc Med*. 2004;158:620-4.
- 237 Kairuz T, Svirskis D, Sheridan J. Children's prescription medicines: parents' perceptions on dosing intervals, dosing devices and prescription advice. *Int J Pharm Pract*. 2007 Mar;15(1):11-5.
- 238 Simon H, Weinkle D. Over-the-counter medications. Do parents give what they intend to give? *Arch Pediatr Adolesc Med*. 1997;151:654-6.
- 239 Hodgson C, Wong ICK. What do mothers of young children think of community pharmacists? A descriptive survey. *J Fam Health Care*. 2004;14(3):73-9.
- 240 Moffett BS, Mott AR, Nelson DP, Gurwitch KD. Medication dosing and renal insufficiency in a paediatric cardiac intensive care unit: impact of pharmacist consultation. *Pediatr Cardiol*. 2008 Jul;29(4):744-8. Epub 2007 Dec 14.
- 241 Chan DS, Callahan CW, Moreno C. Multidisciplinary education and management program for children with asthma. *Am J Health Syst Pharm*. 2001 Aug 1;58(15):1413-7.
- 242 Kaushal R, Bates DW, Abramson E L, Soukup J R, Goldmann D A. Unit-based clinical pharmacists' prevention of serious medication errors in pediatric inpatients. *Am J Health Syst Pharm*. 2008;65:1254-60
- 243 Emmerton L, Shaw J, Kheir N. Asthma management by New Zealand pharmacists: a pharmaceutical care demonstration project. *J Clin Pharm Ther*. 2003 Oct;28(5):395-402
- 244 Cordina M, McElnay JC, Hughes CM. Assessment of a community pharmacy-based program for patients with asthma. *Pharmacotherapy*. 2001 Oct;21(10):1196-203.
- 245 Schulz M, Verheyen F, Mühlig S, Müller JM, Mühlbauer K, Knop-Schneickert E, Petermann F, Bergmann KC. Pharmaceutical care services for asthma patients: a controlled intervention study. *J Clin Pharmacol*. 2001 Jun;41(6):668-76.
- 246 Diamond SA, Chapman KR. The impact of a nationally coordinated pharmacy-based asthma education intervention. *Can Respir J*. 2001 Jul-Aug;8(4):261-5.
- 247 McLean W, Gillis J, Waller R. The BC Community Pharmacy Asthma Study: A study of clinical, economic and holistic outcomes influences by an asthma care protocol provided by specially trained community pharmacists in British Columbia. *Can Resp J*. 2003; 10 (4):195-202.
- 248 González-Martin G, Joo I, Sánchez I., Evaluation of the impact of a pharmaceutical care program in children with asthma. *Patient Educ Couns*. 2003 Jan;49(1):13-8.

- 249 Hunter KA, Bryant BG. Pharmacist provided education and counseling for managing pediatric asthma. *Patient Educ Couns*. 1994 Oct;24(2):127-34.
- 250 Malik R, Hampton G. Counseling hospitalized pediatric patients with asthma. *Am J Health-Syst Pharm*. 2002;59:1829,1833.
- 251 Bains T. Collaborative care of pediatric oncology patients - Focus on the Pharmacy Team clinical trials. *International Pharmaceutical Journal*. 2009;24(1):10-15.
- 252 Cimino MA, Kirschbaum MS, Brodsky L, Shaha S. Assessing medication prescribing errors in pediatric intensive care units. *Pediatr Crit Care Med*. 2004;5:124-32.
- 253 Folli HL, Poole RL et al. Medication Error Prevention by Clinical Pharmacists in Two Children's Hospitals. *Pediatrics*. 1987;79:718-22.
- 254 Robelet A, Bussieres JF, Marquis C, Lavoie A, Lebel D. Description d'une démarche de mise à niveau de prestation de pharmacie clinique en réanimation pédiatrique. *J Pharm Clin*. 2007;26(4):217-27.
- 255 Patel D. Helping to treat a global problem - as a paediatric HIV pharmacist. *Pharmaceutical Journal*. 2007 Feb;14(2):52-4.
- 256 Breitzkreutz J. European Perspectives on Pediatric Formulations. *Clinical Therapeutics*. 2008;30:2146-54.
- 257 Rantucci M, Stewart C, Stewart I. Médicaments : la sécurité avant tout - Guide à l'intention des pharmaciens pour la prévention et la prise en charge des incidents médicamenteux. Toronto: Pharmacy Practice and L'actualité pharmaceutique; 2004 [cited 2011 Feb 11]. Available from: [http://www.mckesson.ca/documents/Safemeds\\_FR\\_Final.pdf](http://www.mckesson.ca/documents/Safemeds_FR_Final.pdf)
- 258 Teich JM, Merchia PR, Schmiz JL, Kuperman GJ, Spurr CD, Bates DW. Effects of computerized physician order entry on prescribing practices. *Arch Intern Med*. 2000 Oct 9;160(18):2741-7.
- 259 Wang JK, Herzog NS, Kaushal R, Park C, Mochizuki C. Prevention of Pediatric Medication Errors by Hospital Pharmacists and the Potential Benefit of Computerized Physician Order Entry. *Pediatrics*. 2007;119:e77-85.
- 260 Wong IC, Wong LY, Cranswick NE. Minimising medication errors in children. *Arch Dis Child*. 2009 Feb;94(2):161-4. Epub 2008 Oct 1.
- 261 Cordero L, Kuehn L, Kumar RR and Mekhjian HS. Impact of Computerized Physician Order Entry on Clinical Practice in a Newborn Intensive Care Unit. *J Perinatol*. 2004;24: 88-93. doi:10.1038/sj.jp.7211000.
- 262 Krupicka M I, Bratton SL., Sonnenthal K, Goldstein B. Impact of a pediatric clinical pharmacist in the pediatric intensive care unit. *Critical Care Medicine*. 2002 April;30(4):919-21.
- 263 National Prescribing Service Ltd. Prescribing Practice Review: Use of antibiotics in respiratory tract infection. Sydney: National Prescribing Service Ltd.; 2000.
- 264 Otters H, Wouden J, Schellevis F, Suijlekom-Smit L, Koes B. Trends in prescribing antibiotics for children in Dutch general practice. *J Antimicrob Chemother*. 2004;(53):361-366.

- 265 National Prescribing Service Ltd. Common colds need common sense, they don't need antibiotics [media release]. Sydney: National Prescribing Service Ltd; 2006 July 11 [cited 2011 Feb 11]. Available from: [http://www.nps.org.au/news\\_and\\_media/media\\_releases/repository/archive/common\\_colds\\_need\\_common\\_sense\\_they\\_dont\\_need\\_antibiotics4](http://www.nps.org.au/news_and_media/media_releases/repository/archive/common_colds_need_common_sense_they_dont_need_antibiotics4)
- 266 Gerber JS, Newland JG, Coffin SE, Hall M, Thurm C, Prasad PA, Feudtner C, Zaoutis TE. Variability in Antibiotic Use at Children's Hospitals. *Pediatrics*. 2010 Dec;126(6):1067-73. Epub 2010 Nov 15.
- 267 Mulholland P, Grant J, Wallace J, Tomlin S, Fisher H, Stobie S, Brailey A eds. Childhood issues *in* Introduction to paediatric pharmaceutical care. Edinburgh: Scottish Neonatal and Paediatric Pharmacists (SNAPP); 2009 [cited 2011 Feb 11]. Available from: [http://www.nes.scot.nhs.uk/nes\\_resources/paediatrics/Book%20chapters/Chapter%205.pdf](http://www.nes.scot.nhs.uk/nes_resources/paediatrics/Book%20chapters/Chapter%205.pdf)
- 268 Irwin D, Vaillancourt R, Pascuet E, Wright M, Jabbour M, MacLusky I, Poirier S, Albrecht, D. Implementation of pharmacy services in a paediatric emergency department. Poster presented at: the Canadian Society of Hospital Pharmacist (CSHP) 35th Annual Banff Seminar; 2009 March 20-22; Banff, (Canada).
- 269 Terry D, Solanki G, Sinclair A, Marriott J, Wilson K. Medicines reconciliation on admission - don't forget the children. *British Journal of Clinical Pharmacy*. 2009 Jan;1(1):22 [cited 2011 Feb 11]. Available from: <http://www.clinicalpharmacy.org.uk/January/safety.pdf>
- 270 Lien L, Lien E. Preventing potential drug interactions in community pharmacy. *J Clin Pharm Ther*. 1994;19:371-9.
- 271 Nelson A, Hutchinson J, Mahoney D, Ringstrom J. Evaluation of the utilization of medication profiles for the purpose of drug-drug interaction surveillance by pharmacists in a community setting. *Drug Intell Clin Pharm*. 1976;10:274-81.
- 272 Jones A, Benzie J, Serjeant C, Swan G. Activities of clinical pharmacist at ward level. *Australian Journal of Hospital Pharmacy*. 1984;14(2):77-81.
- 273 Swan G, Benzie J, Jones A, Serjeant C. Medication chart review: an analysis. *Australian Journal of Hospital Pharmacy*. 1984;14:105-8.
- 274 Souza MC, Goulart MA, Rosado V and Reis AMM. Study utilization of parenteral medications in pediatric unit of university hospital. *Rev Bras Cienc Farm*. 2008;44(4):675-82. doi: 10.1590/S1516-93322008000400014.
- 275 Nilsson J, Andersson A, Kalvemarm S, Lieberman-Ram H, Ullenius B, Wendel A. Surveys of drug-related therapy problems of patients using medicines for allergy, asthma and pain. *Int J Pharm Pract*. 2000;8:198-203.
- 276 Pugh C. Pre-OBRA '90 Medicaid survey: how community pharmacy practice is changing. *American Pharmacy*. 1995;NS35(February):17-23.
- 277 Rupp M. Value of community pharmacists' interventions to correct prescribing errors. *Ann Pharmacother*. 1992;26:1580-4.
- 278 Chong JJ, Davidsson A, Moles R, Saini B. What affects asthma medicine use in children? Australian asthma educator perspectives. *J Asthma*. 2009 Jun;46(5):437-44.

- 279 Summers B, Summers RS, Rom S. The effect of a specialist clinic with pharmacist involvement on the management of epilepsy in paediatric patients. *J Clin Hosp Pharm*. 1986 Jun;11(3):207-14.
- 280 Chen T. Interprofessional collaboration between community pharmacists and general practitioners in medication regimen review [thesis]. Sydney: University of Sydney; 2001.
- 281 Kjeldby C, Bjerre A, Refsum N. Klinisk farmasøyt i tverrfaglig gruppe på barneavdeling. *Tidsskr Nor Lægeforen*. 2009 Sep 10;129(17):1746-9.
- 282 Morrison P, Abu-Arafeh, Davison J, Chapman S. Optimum prescribing of discharge medicines: roles of hospital and community pharmacists. *Pharmaceutical Journal*. 2004 Feb 21;272(7287):224-7.
- 283 Voirol P, Kayser S R, Chang CY, Chang QL, Youmans SL. Impact of Pharmacists' Interventions on the Pediatric Discharge Medication Process. *Ann Pharmacother*. 2004 Oct;38:1597-602.
- 284 Gonzales K. Medication Administration Errors and the Pediatric Population: A Systematic Search of the Literature. *J Pediatr Nurs*. 2010 Dec;25(6):555-65.
- 285 Prot S, Fontan JE, Alberti C, Bourdon O, Farnoux C, Macher MA, Foureau A, Faye A, Beaufils F, Gottot S, Brion F. Drug administration errors and their determinants in pediatric in-patients. *Int J Qual Health Care*. 2005 Oct;17(5):381-9. Epub 2005 Aug 22.
- 286 Wirtz V, Taxis K, Barber D. An observational study of intravenous medication errors in the United Kingdom and in Germany. *Pharm World Sci* 2003; 25(3): 104–111.
- 287 Chien C, Marriott J, Ashby K, Ozanne-Smith J. Unintentional ingestion of over the counter medications in children less than 5 years old. *J Paediatr Child Health*. 2003;39:264-9.
- 288 McD Taylor D, Robinson J, MacLeod D, MacBean C, Braitberg G. Therapeutic errors among children in the community setting: nature, causes and outcomes. *J Paediatr Child Health*. 2009;45:304-9.
- 289 New South Wales Poisons Information Centre. 2008 Annual Report. Westmead (New Zealand): New South Wales Poisons Information Centre; 2009.
- 290 Madlon-Kay D, Mosch F. Liquid medication dosing errors. *J Fam Pract*. 2000;49:741-4.
- 291 Sobhani P, Christopherson J, Ambrose P, Corelli R. Accuracy of oral liquid measuring devices: comparison of dosing cup and oral dosing syringe. *Ann Pharmacother*. 2008;42:46-52.
- 292 Conroy S, Collier J, Birchley N, Neil K, Rodgers S, McIntyre J, Choonara I, Avery A. An examination of the risk management issues in the handling at home of over-the-counter medicines purchased for children. *Pharmaceutical Journal*. 2003;271:209-13.
- 293 McMahon S, Rimsza M, Bay R. Parents can dose liquid medication accurately. *Pediatrics*. 1997; 100: 330-4.
- 294 Carr A, Patel R, Jones M, Suleman A. A pilot study of a community pharmacist intervention to promote the effective use of emollients in childhood eczema. *Pharmaceutical Journal*. 2007 Mar 17;278(7443):319-22.
- 295 Kalina M, Tinkoff G, Gleason W, Veneri P, Fulda G. A multidisciplinary approach to adverse drug events in pediatric trauma patients in an adult trauma center. *Pediatr Emerg Care*. 2009 Jul;25(7):444-6.

- 296 Murphy R, Chionglo M, Dupuis LL. Impact of a pharmacist-initiated therapeutic drug monitoring consult service for children treated with gentamicin. *Can J Hosp Pharm* 2007. Jun;60(3):162-8.
- 297 Le J, Nguyen T, Law AV, Hodding J. Adverse drug reactions among children over a 10-year period. *Pediatrics*. 2006 Aug;118(2):555-62.
- 298 Bussi eres J-F, Robelet A, Therrien R, Touzin K. D emarche pour la mise   niveau d'un secteur de soins pharmaceutiques : le cas de l'h emato-oncologie p diatrique. *J Can Pharm Hosp*. 2010;63(2):119-129.
- 299 Halim M, Vincent H, Saini B, H ameen-Anttila K, Vainio K, Moles R. Validating the children's medicines use questionnaire (CMUQ) in Australia. *Pharm World Sci*. 2010 Feb;32(1):81-9. Epub 2009 Nov 4.
- 300 L'enfant, un malade pas comme les autres [Internet]. 2010 [updated 2010 Oct 4; cited 2011 Feb 11]. Available from: <http://www.destinationsante.com/L-enfant-un-malade-pas-comme-les-autres.html>
- 301 NPPG, RCPCH and WellChild. About us [online]. London: NPPG, RCPCH and WellChild; 2009 [cited 2011 Feb 11]. Available from: <http://www.medicinesforchildren.org.uk/about/index.php>
- 302 Wong I, Siew S, Edmondson H. Children's over-the-counter medicines pharmacoepidemiological (COPE) study. *Int J of Pharm Pract*. 2007;15:17-22.
- 303 Ordre national des pharmaciens and Afssaps. Information importante : le m dicament qui vient de vous  tre d livrer ne doit pas  tre utilis  pour traiter la toux des enfants de moins de 2 ans. Paris and La Plaine Saint Denis: Ordre national des pharmaciens and Afssaps; 2010 [cited 2011 Feb 11]. Available from: <http://www.cespharm.fr/fr/content/download/15185/322086/file/information-importante-contre-indication-des-mucolytiques-chez-le-nourrisson.pdf>
- 304 Children's Hospital of Eastern Ontario, McGill University Health Centre, McGill Molson Medical Informatics. Helping Medication Taste Better [Internet]. Ottawa: Canadian Association of Paediatric Health Centres, 2010 [updated 2010 Dec 14; cited 2011 Feb 11]. Available from: <http://www.ken.caphc.org/xwiki/bin/view/PatientSafety/Helping+Medication+Taste+Better>
- 305 M dicaments   la maison [patient leaflet]. Paris: Afssaps, Les entreprises du m dicament, Ordre national des pharmaciens, Cespharm; 2008 [cited 2011 Feb 11]. Available from: [http://www.afssaps.fr/var/afssaps\\_site/storage/original/application/71fa56dc1ce73d4ee903d30f0cedeeb2.pdf](http://www.afssaps.fr/var/afssaps_site/storage/original/application/71fa56dc1ce73d4ee903d30f0cedeeb2.pdf)
- 306 Apotek. B rn og medicin [patient brochure]. Copenhagen: Apotek; 2004 [cited 2011 Feb 11] Available from: [http://www.apotekerforeningen.dk/pdf/kampagner/brochure\\_boern-og-medicin.pdf](http://www.apotekerforeningen.dk/pdf/kampagner/brochure_boern-og-medicin.pdf)
- 307 Canadian Pharmacists Association. Kids' Centre [Internet]. 2009 [cited 2011 Feb 11]. Available from: [http://www.pharmacists.ca/content/consumer\\_patient/resource\\_centre/kids\\_centre/index.cfm](http://www.pharmacists.ca/content/consumer_patient/resource_centre/kids_centre/index.cfm)
- 308 Low JK, Baldwin JN, Greiner GE. Pediatric Pharmacy Education for U.S. Entry-Level Doctor of Pharmacy Programs. *Am J Pharm Educ*. 1999;63:323-7 [cited 2011 Feb 11]. Available from: <http://www.ajpe.org/legacy/pdfs/aj630312.pdf>
- 309 American Society of Health-system Pharmacists. Online residency programme [Internet]. Bethesda: ASHP; 2010 [cited 2011 Feb 11]. Available from: <http://accred.ashp.org/aps/pages/directory/residencyprogramDirectory.aspx?pageno=2>
- 310 New York Board of Pharmacy. Continuing Education [Internet]. Albany (NY): New York Board of Pharmacy; 2008 [cited 2011 Feb 11]. Available from: <http://www.op.nysed.gov/prof/pharm/pharmceqa.htm>



- 311 NHS Scotland. Child Protection: "It's everyone's job to make sure I'm alright". Edinburgh: NHS Scotland; 2008 [cited 2011 May 11]. Available from: <http://www.nes.scot.nhs.uk/media/712908/child%20protection%20low%20res.pdf>
- 312 Diamantis S. Paediatrics Short Course [unpublished lecture notes]. Seminar on Pediatrics, Pharmaceutical Society of Australia; lecture given 2010.
- 313 Moles R. Promoting Good Health in Children [unpublished lecture notes]. Seminar on Promoting Good Health in Children, Pharmaceutical Society of Australia; lecture given 2010.
- 314 National Community Pharmacists Association. Epilepsy - New Drug Therapies for the Pediatric Patient [Internet]. Alexandria (VA): National Community Pharmacists Association; 2010 [cited 2011 Feb 11]. Available from: [http://www.cecity.com/ce-bin/owa/pkg\\_disclaimer\\_html.display?ip\\_mode=secure&ip\\_test\\_id=15054&ip\\_company\\_code=NCPA&ip\\_cookie=](http://www.cecity.com/ce-bin/owa/pkg_disclaimer_html.display?ip_mode=secure&ip_test_id=15054&ip_company_code=NCPA&ip_cookie=)
- 315 New Zealand College of Pharmacists. Pain and Fever in Children (July 2010): Most Recent Audio conferences [audio files]. Wellington: New Zealand College of Pharmacists; 2010 [cited 2011 Feb 11]. Available from: <http://www.psnz.org.nz/public/cop/index.aspx>
- 316 Professional Development 2008 Calendar as at 01/08/2008. Inpharmation. 2008 Aug [cited 2010 Oct 28]. Available from: [http://www.shpa.org.au/lib/pdf/branches/qld\\_newsletter\\_aug08.pdf](http://www.shpa.org.au/lib/pdf/branches/qld_newsletter_aug08.pdf)
- 317 Université d'Auvergne Clermont Ferrand 1. D.U. Pharmacie clinique pédiatrique [Internet]. Clermont-Ferrand: Université d'Auvergne Clermont Ferrand 1; 2010 [cited 2011 Feb 11]. Available from: <http://www.u-clermont1.fr/pharmacie/formationcontinue/pediatrie.htm>
- 318 Université de Genève. Cycle de conférences pour pharmaciens [Internet]. Geneva: Université de Genève; 2010 [cited 2010 Oct 28]. Available from: <http://www.unige.ch/formcont/pharmaconf.html>
- 319 Université Saint Joseph. Le Pharmacien et les Pathologies Pédiatriques - Archives des actualités [Internet]. Beirut: Université Saint Joseph; 2007 [cited 2011 Feb 11]. Available from: <http://www.fp.usj.edu.lb/files/archives.php>
- 320 University of Illinois at Chicago. Pediatric Residency (PGY2) [Internet]. Chicago (IL): University of Illinois at Chicago; 2007 [cited 2011 Feb 11]. Available from: [http://www.uic.edu/pharmacy/education/residency\\_fellowship\\_program/PGY2S/PGY2\\_Pedia.php](http://www.uic.edu/pharmacy/education/residency_fellowship_program/PGY2S/PGY2_Pedia.php)
- 321 Pediatric Pharmacy Advocacy Group. Online CE Programs [Internet]. Memphis (TN): Pediatric Pharmacy Advocacy Group; 2011 [cited 2011 Feb 11]. Available from: <http://www.ppag.org/online-ce/>
- 322 Pharmaceutical Society of South Africa. CPD Session Dates [Internet]. Pretoria: Pharmaceutical Society of South Africa; 2011 [cited 2011 Feb 11]. Available from: [http://pssa.org.za/index.php?option=com\\_content&task=blogcategory&id=36&Itemid=77](http://pssa.org.za/index.php?option=com_content&task=blogcategory&id=36&Itemid=77)
- 323 College of Pharmacy Practice and Faculty of Neonatal & Paediatric Pharmacy (FNPP). General Paediatric Competencies. London: College of Pharmacy Practice and Faculty of Neonatal & Paediatric Pharmacy (FNPP); 2006 [cited 2011 Feb 11]. Available from: <http://collpharm.elephantsneverforget.co.uk/Portals/6/1%20General%20Paediatric%20Competencies.pdf>

- 324 Board of Pharmacy Specialties. BPS Approves Ambulatory Care Designation; Explores New Specialties in Pain and Palliative Care, Critical Care and Pediatrics [Press release]. Washington, DC: Board of Pharmacy Specialties; 2011 Apr 19 [cited 2011 May 12]. Available from: [http://www.bpsweb.org/news/pr\\_041911.cfm](http://www.bpsweb.org/news/pr_041911.cfm)
- 325 Scottish Neonatal and Paediatric Pharmacists. Introduction to paediatric pharmaceutical care [Internet]. Edinburgh: Scottish Neonatal and Paediatric Pharmacists (SNAPP); 2010 [cited 2011 Feb 11]. Available from: <http://www.nppg.scot.nhs.uk/misc/An%20Introduction%20to%20Paediatric%20Pharmaceutical%20Care.htm>
- 326 Jarvis S eds. Clinical pharmacy for paediatric critical care. London: Paediatric Intensive Care Pharmacists Special Interest Group of the Neonatal and Paediatric Pharmacists group; 2009 [cited 2011 Feb 11]. Available from: <http://www.nppg.scot.nhs.uk/PICU/Clinical%20pharmacy%20for%20critical%20care.pdf>
- 327 Nsimba SE. Assessing the impact of educational intervention for improving management of malaria and other childhood illnesses in Kibaha District-Tanzania. East Afr J Public Health. 2007 Apr;4(1):5-11.
- 328 Greenhalgh T. The Ribena girls. BMJ. 2009;339:b4136.
- 329 Consejo General de Colegios Oficiales de Farmacéuticos. Campaña Día de la Madre [Internet]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2006 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/870EAC6EFDAC6658C1257181003F1A47/\\$FILE/2006\\_guia\\_mama.htm](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/870EAC6EFDAC6658C1257181003F1A47/$FILE/2006_guia_mama.htm)
- 330 Associação Nacional das Farmácias. Medicamentos e Crianças – Por uma relação segura. Lisbon: Associação Nacional das Farmácias; 2010 May.
- 331 Associação Nacional das Farmácias. Bebé com cólicas, um choro a consolar [leaflet]. Lisbon: Associação Nacional das Farmácias; 2008 Jun.
- 332 Associação Nacional das Farmácias. Quando o bebé bolça... [leaflet]. Lisbon: Associação Nacional das Farmácias; 2010 Jan.
- 333 Associação Nacional das Farmácias. Dermatite da fralda – rabinhos “assados” [leaflet]. Lisbon: Associação Nacional das Farmácias; 2006 Mar.
- 334 pharmaSuisse. Campagne de prévention: «Quand ludique rime avec toxique» [media release]. Bern: pharmaSuisse, 2004 Nov 16 [cited 2011 Feb 11]. Available from: [http://www.presseportal.ch/fr/pm/100004115/100482564/pharmasuisse\\_schweizerischer\\_apotheker\\_v erband\\_soci\\_t\\_suisse\\_des\\_pharmaciens](http://www.presseportal.ch/fr/pm/100004115/100482564/pharmasuisse_schweizerischer_apotheker_v erband_soci_t_suisse_des_pharmaciens)
- 335 Bakalar N. Medications Pose High Poisoning Risk for Children. The New York Times. 2009 Aug 13 [cited 2011 Feb 11]. Available from: <http://www.nytimes.com/2009/08/13/health/13poison.html>
- 336 Slovenian Pharmaceutical Society. 4 Dan slovenskih lekarn [Internet]. Ljubljana: Slovenian Pharmaceutical Society; 2008 [cited 2011 Feb 11]. Available from: <http://www.sfd.si/?mod=aktualno&action=viewOne&ID=72>
- 337 Turkish Pharmacists' Association. Let the tough pave the way. Let the way bring the truth.... Ankara: Turkish Pharmacists' Association; 2009. Projects co-financed by the European Union; p17-29.



- 338 Kibel M, Lake L, Pendlebury S, Smith C, eds. South African Child Gauge 2009/2010. Cape town: Children's Institute, University of Cape Town; 2010 [cited 2011 Feb 11]. Available from: [http://www.ci.org.za/depts/ci/pubs/pdf/general/gauge2009-10/south\\_african\\_child\\_gauge\\_09-10.pdf](http://www.ci.org.za/depts/ci/pubs/pdf/general/gauge2009-10/south_african_child_gauge_09-10.pdf)
- 339 Slovenian Pharmaceutical Society. Zdravko Dren [song for children]. Ljubljana: Slovenian Pharmaceutical Society; 2008 [cited 2011 Feb 11]. Available from: [http://www.sfd.si/uploads/datoteke/zdravko\\_dren\\_final.mp3](http://www.sfd.si/uploads/datoteke/zdravko_dren_final.mp3)
- 340 Thom A. Child Gauge unpacks Children's Act impact [Internet]. Health-e. 2010 Jul 27 [cited 2011 Feb 11]. Available from: <http://www.health-e.org.za/news/article.php?uid=20032876>
- 341 American Pharmacists Association. Guide to Educating Children About Medicines [Internet]. Washington DC: American Pharmacists Association; 2011 [cited 2011 Feb 11]. Available from: <http://www.pharmacist.com/AM/Template.cfm?Section=Home2&Template=/CM/HTMLDisplay.cfm&ContentID=3542>
- 342 Slovenian Pharmaceutical Society. 5 Dan Slovenskih Lekarn [Internet]. Ljubljana: Slovenian Pharmaceutical Society; 2009 [cited 2011 Feb 11]. Available from: <http://www.sfd.si/?mod=aktualno&action=viewOne&ID=165>
- 343 Peura S. Health Promotion in Community Pharmacy - Country Report: Finland. Vienna: Ludwig Boltzmann-Institut for Sociology of Health and Medicine; 2001 Mar [cited 2011 Feb 11]. Available from: <http://www.univie.ac.at/phc/pics/docs/doc85.pdf>
- 344 Grassby P. Patient/user orientated health promotion (POHP) in Community Pharmacy in Ireland. Country Report – Ireland. Vienna: Ludwig Boltzmann-Institut for Sociology of Health and Medicine; [cited 2011 Feb 11]. Available from: <http://www.univie.ac.at/phc/pics/docs/doc87.pdf>
- 345 Bell HM, McElnay JC, Hughes CM, Watt S, Gleadhill I. Primary school teachers' knowledge of asthma and the impact of pharmacist intervention. *Pharmaceutical Journal*. 1998 Sep 19;261(7012):R35.
- 346 Capilla P, Aliaga A. Campaigns for sun protection [poster]. Poster presented at: the FIP Congress; 2002; Nice [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000034.nsf/voDocumentos/731E260FEB47C3DCC1256DDA005C7448/\\$File/2002%20Cartel%20DERMOFARM1.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000034.nsf/voDocumentos/731E260FEB47C3DCC1256DDA005C7448/$File/2002%20Cartel%20DERMOFARM1.pdf)
- 347 Consejo General de Colegios Farmacéuticos. Campaña: Sol, Piel y Fotoprotección [leaflet for children and their parents]. Madrid: Consejo General de Colegios Farmacéuticos; 2001 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/EDDE5D03DA4E5CF0C1257101004A01E5/\\$File/07\\_folleto\\_sol.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/EDDE5D03DA4E5CF0C1257101004A01E5/$File/07_folleto_sol.pdf)
- 348 Consejo General de de Colegios Oficiales de Farmacéuticos. Sol, piel y fotoprotección - Campaña educative sobre la protección solar en las escuelas [presentation]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2004 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000029.nsf/voDocumentos/D7120F19995DA679C1256E6D0035F498/\\$File/2004\\_1.pps](http://www.portalfarma.com/pfarma/taxonomia/general/gp000029.nsf/voDocumentos/D7120F19995DA679C1256E6D0035F498/$File/2004_1.pps)

- 349 Consejo General de Colegios Oficiales de Farmacéuticos. Campaña de higiene bucodental: boca sana, niños contentos [Internet]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2005 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000029.nsf/voDocumentos/B4100FA42A7CA131C1256FC40030C662/\\$File/index.htm](http://www.portalfarma.com/pfarma/taxonomia/general/gp000029.nsf/voDocumentos/B4100FA42A7CA131C1256FC40030C662/$File/index.htm)
- 350 Associação Nacional das Farmácias. Museu da Farmácia sensibiliza crianças para a Gripe A [press release]. Lisbon: Associação Nacional das Farmácias; 2009 Oct 2 [cited 2011 Feb 11]. Available from: [http://www.anf.pt/media/CI\\_MuseudaFarmacia.pdf](http://www.anf.pt/media/CI_MuseudaFarmacia.pdf)
- 351 Colegio de Farmacéuticos de la Provincia de Buenos Aires. Prevención de DENGUE [presentation]. Buenos Aires: Colegio de Farmacéuticos de la Provincia de Buenos Aires; 2009 [cited 2011 Feb 11]. Available from: <http://www.colfarma.org.ar/ar/descargas/varios/Prevencion%20de%20Dengue.pps>
- 352 Centers for Disease Control and Prevention. Updated Interim Recommendations for the Use of Antiviral Medications in the Treatment and Prevention of Influenza for the 2009-2010 Season [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; 2009 [cited 2011 Feb 11]. Available from: <http://www.cdc.gov/h1n1flu/recommendations.htm>
- 353 Colegio Oficial de Farmacéuticos de Cantabria. Campaña de los Desayunos Saludables. Santander: Colegio Oficial de Farmacéuticos de Cantabria; 2009.
- 354 Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Internet]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2010 [cited 2011 Feb 11] Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_plenufarII.htm?OpenElement](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_plenufarII.htm?OpenElement)
- 355 Associação Nacional das Farmácias. + activos, + saúde – previna o excesso de peso [Leaflet]. Lisbon: Associação Nacional das Farmácias, 2010 Oct.
- 356 Associação Nacional das Farmácias. Alimentação infantil - À DESCOBERTA DOS NOVOS SABORES. Lisbon: Associação Nacional das Farmácias; 2009.
- 357 Campaña “A tu salud”. Farmacéuticos. 2002;270:13 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/E67A0291D02AE68BC1256CAF00417404/\\$File/AI%20d%C3%ADa%20%28Colegios%29.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/E67A0291D02AE68BC1256CAF00417404/$File/AI%20d%C3%ADa%20%28Colegios%29.pdf)
- 358 Consejo Andaluz de Colegios Oficiales de Farmacéuticos. Tarjetas "A Tu Salud" [patient leaflets]. Sevilla: Consejo Andaluz de Colegios Oficiales de Farmacéuticos; 2002-2010.
- 359 Colegios Oficiales de Farmacéuticos de Aragón. Consejos de seguridad en las piscinas por tu salud [patient leaflet]. Zaragoza: Colegios Oficiales de Farmacéuticos de Aragón; 2009 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/EF548C22347A5170C1257643002A1FCB/\\$File/GUIA%20JUNIO.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/EF548C22347A5170C1257643002A1FCB/$File/GUIA%20JUNIO.pdf)

## APPENDIX 1: EXAMPLES OF ACTIVITIES RUN BY PHARMACISTS' ORGANISATIONS

### **I) Project for Medicine education (Finland)**

Katri Hämeen-Anttila, PhD

Kirsti Vainio, PhD

University of Eastern Finland, Faculty of Health Sciences, School of Pharmacy / social pharmacy

Every one of us will need to use medication at some point during our lives. Thus, the proper use of medication is an everyday life skill which needs to be learned. From this point of view, it is surprising that proper use of medication is seldom taught to children as a part of school health education. One reason for this might be that the teachers are not experts on the topic of medication. To integrate medicines into health education, teachers would need materials targeted to children of different ages and different developmental stages. This problem was brought to light and addressed in Finland during a medicine education project which started in the early 2000's.

The Medicine education project began by finding out how children of different ages understand medicine related topics and what they would like to know about medicines. The study revealed that the understanding that children had about medicines was quite superficial and that they had gained their knowledge about medicines during everyday life, resulting in a fragmented understanding of medication (Hämeen-Anttila et al. 2006a). Before creating the materials, the teachers were also asked what they considered suitable topics about medication for children of different ages. Teachers' opinions about the importance of medicine education as a part of school health education were also assessed (Hämeen-Anttila et al. 2005, Hämeen-Anttila et al. 2006b).

Using the information gained to this point, a multi-disciplinary team including fourth-year pharmacy students (n=13) supervised by three pharmacists and five elementary school teachers, developed the materials over two semesters. These materials are accessible on the Internet at <http://www.uku.fi/laaekasvatus>, in Finnish. An approach of empowerment was chosen for the materials with the aim of teaching children the skills needed when using medications.

In the last part of this project, the materials were piloted by a group of teachers (n=14), and their usefulness was evaluated during focus group discussions following a teaching period (Hämeen-Anttila et al. 2006c). Finally, the website with this material was revised according to the results, and comprehensive educational materials were developed ([www.uku.fi/laaekasvatus](http://www.uku.fi/laaekasvatus)). Following this, the usefulness of assignments targeting 7–9-year-old children were evaluated (Hämeen-Anttila et al. 2009). The assignments were found to be useful for this age group, and furthermore, they allowed flexibility to be used in diverse situations with different groups of children.

Due to the international interest to the website, the main parts of this website were translated into English ([www.uku.fi/medicinescurriculum](http://www.uku.fi/medicinescurriculum)). This English version includes information about the proper use of medications, lesson plans for students of different ages and school grades, and 12 student assignments with ready-to-print materials. There is evidence that children in different countries with different cultures are similar with respect to their knowledge, attitudes and behaviours concerning medication use (Hämeen-Anttila and Bush 2008). Lessons learned from the development of the Finnish education material (Hämeen-Anttila et al. 2006c) could most likely be applied in other European countries and the material could be used with only a few minor adjustments.

### References:

- Hämeen-Anttila K, Bush PJ. Healthy children's perceptions of medicines: a review. *Res Social Adm Pharm* 2008;4:98-114. [2008]
- Hämeen-Anttila K, Juvonen M, Ahonen R, Bush PJ, Airaksinen M. What schoolchildren should be taught about medicines? -Combined opinions of children and teachers. *Health Educ* 2005;105:424–36 [2005]
- Hämeen-Anttila K, Juvonen M, Ahonen R, Bush PJ, Airaksinen M. How well can children understand medicine related topics? *Patient Educ Couns* 2006;60:171-8. [2006a]
- Hämeen-Anttila K, Airaksinen M, Timonen J, Bush PJ, Ahonen R. Medicine education for schoolchildren – What do the teachers think? *Health Educ* 2006;106:480–90. [2006b]
- Hämeen-Anttila K, Airaksinen M, Vainio K, Bush PJ, Ahonen R. Developing a medicine education program in Finland: lessons learned. *Health Policy* 2006;78(2-3):272-83. [2006c]
- Hämeen-Anttila K, Honkanen L, Vainio K. The usability of medicine education assignments for seven to nine year -old children. *Health Educ* 2009;109:491–506. [2009]

## **II) Rational use of medicines – lectures in Elementary and High schools (Japan)**

With the support of the Japanese Ministry of Health and in collaboration with the Council for the Proper Use of Medications, the Japan Pharmaceutical Association developed in 2007 educational materials on the rational use of medicines to enable pharmacists to give lectures in elementary and high-schools.

Taking into account the age and grade levels of the students, two different lecture materials were created:

- one for elementary school students: focusing on the basic understanding of medicine
- and another one for high school students, with additional and more extensive information.

A website was also developed to support education and is accessible at: <http://www.rad-are.com>

The lecture materials are available at:

<http://www.nichiyaku.or.jp/contents/keihatsu/default.html>



### **III) Boat Clinic implemented by C-NES in partnership with NRHM, Assam (India)**

Agency / Association running the project: Centre for North East Studies and Policy Research (C-NES), Assam, India

C-NES has been providing basic health care services to communities who do not have access to health facilities in the river islands of the Brahmaputra through its Boat Clinic initiatives in a Public Private Partnership (PPP) with the National Rural Health Mission (NRHM), Government of Assam. These specially developed boats are equipped with laboratories on board as well as pharmacies. UNICEF is also supporting the programme in the Dibrugarh and Lakhimpur districts where it works with C-NES on health training and skill development as well as a school outreach programme to involve children who have dropped out of school or have never attended school.

#### **Background**

In May 2005, the organisation launched the Boat Clinic initiative to deliver health services to people living on the islands of the Brahmaputra in the state of Assam. C-NES started with one boat and seven staff members in the Dibrugarh district in 2005, with support from district health and administration as well as modest assistance from Oil India Limited, Assam Oil Ltd and local NGOs and business organisations. This successful intervention received recognition which attracted UNICEF and later NRHM, Govt. of Assam, which wanted to reach out to a larger population. In the first phase of the partnership with NRHM, beginning February 2008, the Boat clinic programme was implemented in 5 districts of Assam: Dibrugarh, Tinsukia, Dhemaji, Morigaon and Dhubri. In the second phase, beginning March 2009, 5 more districts Lakhimpur, Jorhat, Sonitpur, Nalbari and Barpeta were added. Since August 2010, 3 more districts, Kamrup, Goalpara, Bongaigaon along with one additional unit each in Barpeta and Dhubri have been brought under the Boat Clinic health initiative.

#### **The goal**

To bring sustained healthcare to thousands of people on the islands for the first time since independence, with a special focus on women and children, who are the most vulnerable in difficult conditions. The organisation and its programmes are driven to provide people with fundamental rights in the sphere of health, education and sanitation, among others.

The goal is to reach one million people or one third of the state's vulnerable population who live on islands on the Brahmaputra, by 2012.

The health teams, lead by District Programme Officers (DPOs), work extensively on delivering basic health services with priority given to the delivery of the national immunization programme for children as well as pre and post-natal checkups for women. A series of camps to deliver these services are organised by developing work plans for each district to cover the islands in association with the NRHM, the Joint Directors of Health as well as C-NES' teams of District Programme Officers (DPOs) and Community Workers; the latter are the organising core of the outreach. The teams make 5-6 trips per month to selected islands and conduct camps for 10 to 20 days in duration. There are two Medical Officers per boat and the paramedical staff includes two ANMs, a GNM, a pharmacist and one laboratory technician. With the involvement of local communities, the DPOs hold camps in a series of villages.

Awareness meetings are held with the communities on relevant topics in order to educate and inform them on issues like reproductive health, population control, sanitation, nutrition and malaria control. Information Education Communication (IEC) materials are extensively used. Doctors make use of the feedback in self assessment and in assessing quality of care. Disease analysis is done by the doctors using records maintained at each camp. Each section of the team maintains records and data which provide material for computation and analysis. Reviews of the above sections are done every 6 months by experts nominated by the Board of Trustees.

## Outreach

The population is divided by district and the number of river islands in which boat clinics are currently functioning is as follows:

District	No. of River Islands/ Bankline areas	No. of River Islands/Bankline areas covered	No. of Villages	No. of Villages Covered	Population Covered
Tinsukia	10	10	41	23	14,967
Dibrugarh	14	14	17	17	12,882
Dhemaji	11	11	14	14	9,271
Morigaon	38	25	38	25	29,190
Dhubri	125	35	480	35	1,30,000

Source: Block, District Health Society and C-NES survey

## Pharmacists' Involvement

The pharmacist is an integral and important part of the healthcare team involved in the project. One pharmacist member of each healthcare team in a boat clinic looks after the mobile pharmacy and provides support to the medical staff in the care of neonates, children and mothers. The pharmacist also provides support in the area of emergency care, long term care to mothers and children and the immunisation of children.

## Summary

The boat clinic project is an innovative project which supports the healthcare needs of remote areas. It provides essential emergency and routine health care facilities for the small islands and villages which are out of reach of current healthcare services. The different healthcare needs of mothers, pregnant women and children are fulfilled by a team of trained medical and paramedical staff, including a pharmacist, who travels in boats with the necessary supplies of medications, vaccines and nutraceuticals.

## IV) Child-to-child Health Programme (India)

Agency / Association running the project: St. Stephen's Hospital, Delhi, India

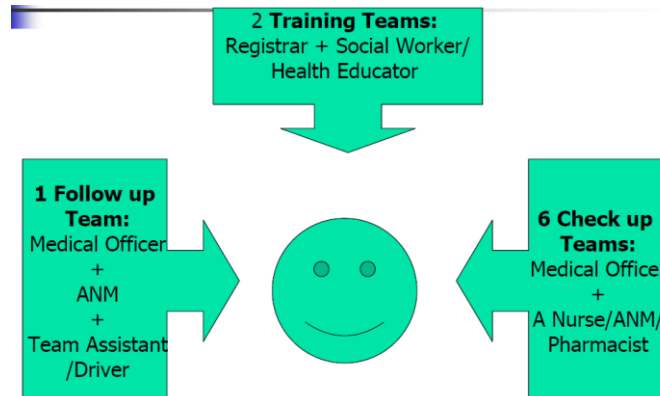
### Background

The school years are a formative period in the lifespan of a human being. School provides an ideal setting for the development of knowledge, self esteem, life skills and behaviour. In addition, schools can also provide an opportunity for introducing health related information to children. It is thought that coordinating education and health services and promoting a healthy environment in schools would be one of the most efficient means of improving the health status of a community. Thus, the school health programmes (SHP) came into existence. Over the past 70 years, school health has evolved from a narrow concept of the medical examination of children to comprehensive health care. Universally three areas are recognised to be integral components of the SHP – health services, health education and a healthy environment. The child-to-child health programme of St. Stephen's hospital was conceptualized and carried out in association with many school organisations and governmental agencies benefiting many academic institutes and large school-age population.

### Objectives

- To generate awareness among the stakeholders of a school to make it a safe and healthy place for students.
- To organise and train a school-based healthcare team (consisting of students and teachers) in the schools to participate in the entire process of health education and the delivery of service.
- To build positive health behaviour among children through life skill education and participatory, action based health education.
- To conduct periodic health checkups.

### Health Care- Team:



### Programme modalities

- Training of Health Leaders and Health Scouts
- Medical Examination: Once per year
- Formation of School Health Organisations:
  - o Health Committees
  - o Sanitation Committee
  - o Tobacco and Drug Abuse Fighters
  - o Friends of Environment and Greenery
  - o Children for Safe Communities etc.
- Regular follow up visits by the School Health Team of St. Stephen's Hospital
- Medical Support
- Supportive Supervision of School Health Teams
- Health Education

### Outreach

More than 20 schools involved benefiting thousands of students either directly or indirectly.

### Pharmacists' Involvement

The pharmacist as a part of the health check-up team facilitated the screening and evaluation of the health conditions of students. The pharmacist also became a partner in the health care awareness campaign targeting students.

## **V) Collective Prescribing in Quebec (Canada)**

A *collective prescription* allows one or more pharmacists in Quebec to initiate or adjust medication therapy for a group of patients. These patients must fit a defined target population and the prescription is issued under the name of a physician that has agreed to the collective prescription.



There are four examples of collective prescriptions in Quebec that allow pharmacists to become involved in various stages of maternal-child health.

### **Example 1: Initiate hormonal contraception**

As part of family planning, pharmacists in Quebec are able to initiate hormonal contraception for women in good health. This increases access to hormonal contraception and may decrease the number of unintended pregnancies. Pharmacists are responsible for the initiation of hormonal contraception and for monitoring of the medication therapy.

### **Example 2: Initiate nicotine replacement therapy**

Pharmacists in Quebec are able to initiate nicotine replacement therapy (NRT) using a collective prescription. This is beneficial for women who are planning a pregnancy and wish to use NRT as part of a smoking cessation program, as smoking during pregnancy has negative implications for the foetus. Additionally, pharmacists have a role in smoking cessation for mothers with young children at home. By targeting this population for smoking cessation, the amount of exposure to second-hand smoke may be reduced.

### **Example 3: Initiate medication for management of nausea and vomiting in pregnancy**

Using this collective prescription pharmacists are able to prescribe doxylamine for women experiencing nausea and vomiting during pregnancy. Accessibility is improved with pharmacist-prescribed doxylamine because women are not reliant on a physician visit to receive the medication. Nausea and vomiting in pregnancy can be debilitating for many women and timely access to effective medications from a pharmacist can help to resolve symptoms sooner.

### **Example 4: Initiate vitamin supplementation pre- and post-conception**

This collective prescription allows pharmacists to initiate vitamin supplementation, including folic acid for women during pre- and post-conception stages. Adequate supplementation prior to and during pregnancy can help to prevent neural tube defects and other congenital defects. It also helps to ensure proper nutrition for mother and child. When pharmacists prescribe vitamin supplementation with folic acid, it allows women to have easy, timely access to these products.

## **VI) Plenifar 4 - Improving pregnant women and mothers' nutrition (Spain)**

The Consejo General de Colegios Oficiales de Farmacéuticos through its 4th Continuing Education Programme on Nutrition, launched a campaign on 15 November 2009 to improve nutrition of future mothers (i.e. pregnant women) and of breast-feeding mothers.

The goals of the programme were:

- - To raise women's awareness of the importance of nutrition in the development and the health of their child and themselves in the pre-conception, pregnancy and lactation periods.
- - To improve the health of pregnant women and their future children, through the promotion of healthy nutrition habits.

This programme had a preparatory phase, consisting of training community pharmacists on nutrition. This education aimed to enable them to provide clear, simple and evidence-based advice on healthy eating habits for women based on the stage of their motherhood (pre-conception period, pregnancy and lactation).

For this educational activity, training materials were prepared by the Consejo and included manuals for pharmacists, PowerPoint slides as well as the organisation of video-conferences. Over 3000 pharmacists have been trained to provide support on mother's nutrition

Once trained, pharmacists provide personalised advice to women based on their stage of their motherhood. To support this counselling activity, the Consejo developed several patients education leaflets as well as PowerPoint presentations to supplement the pharmacists' advice. Moreover, a website for women was created and is accessible at: <http://www.acvglobal.com/plenufar4/>

This programme was recognised by the Ministry of Health as an activity of public interest.

#### **References:**

- Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar IV [Website]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2009 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/\\$FILE/index.htm](http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/$FILE/index.htm)
- Consejo General de Colegios Oficiales de Farmacéuticos. Videoconferencia formativa [Online educational conference]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2009 [cited 2011 Feb 11]. Available from: <http://www.portalfarma.com/pfarma/taxonomia/general/gp000035.nsf/vwDocumentos/4993CF1D1C52FF5AC125767200497B24?Opendocument>
- Consejo General de los Colegios Oficiales de Farmacéuticos. Guía/Agenda - Embarazo y lactancia [Patient Handbook]. Madrid: Consejo General de los Colegios Oficiales de Farmacéuticos; 2009 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/\\$FILE/PLFIV\\_AB\\_AGENDA\\_EMBARAZADA.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/$FILE/PLFIV_AB_AGENDA_EMBARAZADA.pdf)
- Consejo General de los Colegios Oficiales de los Farmacéuticos. La importancia de la alimentación sana en la preconcepción, el embarazo y la lactancia [Patient Leaflet]. Madrid: Consejo General de los Colegios Oficiales de los Farmacéuticos; 2009 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/\\$FILE/PLFIV\\_AB\\_FOLLETO\\_DEFINITIVO.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/0/ABF846D8E8DBCCC2C12575B0002C86DD/$FILE/PLFIV_AB_FOLLETO_DEFINITIVO.pdf)

- Nutrición en la mujer embarazada. *Farmacéuticos* 2009 Nov-Dec; 351: 57-65 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/08E07FB892103240C12576A20035B15B/\\$File/57-65.%20Farma%20351.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/08E07FB892103240C12576A20035B15B/$File/57-65.%20Farma%20351.pdf)
- 3.000 farmacéuticos forman a mujeres en etapa preconcepcional, embarazadas y madres lactantes en hábitos alimentarios saludables. *Farmacéuticos* 2009 Nov-Dec; 351: 20-1 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/08E07FB892103240C12576A20035B15B/\\$File/20-21.%20Farma%20351.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000012.nsf/voDocumentos/08E07FB892103240C12576A20035B15B/$File/20-21.%20Farma%20351.pdf)

## VII) Plenufar 2 - Improving children's food habits (Spain)

In 2000, the Consejo General de Colegios Oficiales de Farmacéuticos organized its 2nd Programme on Nutrition (PLENUFAR) targeting children especially those between 10 and 12 year old. For this campaign, pharmacists in collaboration with school teachers, gave lecture to children and their parents on healthy eating habits.

For this programme, the Consejo developed the following tools:

- - for the teacher: campaign introduction, guidelines (technical sheets serving as reference documents on nutrition), 1 CD-ROM and 1 poster
- - for the pharmacist: campaign introduction, guidelines (technical sheets serving as reference documents on nutrition), activity suggestions (sheet to be used), 1 CD-ROM and 1 poster
- - for the children: 1 board and 1 game.

This campaign was also used to collect data on the food habits of children and these results have been summarised by the Consejo in a report.

3000 pharmacists took part in this campaign reaching over 120 000 children in Spain.

### References:

- Consejo General de Colegios Oficiales de Farmacéuticos. Campaña Educativa sobre los hábitos alimentarios en las escuelas - Plenufar II [Website]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available at: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_plenufarII.htm?OpenElement](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_plenufarII.htm?OpenElement)
- Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Presentation of the Campaign]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_triptico\\_plenufar2\\_farmaceuti\\_co.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_triptico_plenufar2_farmaceuti_co.pdf)
- Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Activities Guidelines for pharmacists and teachers]. Madrid: Consejo General de Colegios Oficiales de

- Farmacéuticos; 2000 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_fichas\\_actividades.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_fichas_actividades.pdf)
- Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Poster]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_poster\\_plenufarII.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_poster_plenufarII.pdf)
  - Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Pharmacists Guidelines/Booklet]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_fichas\\_tecnicas.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_fichas_tecnicas.pdf)
  - Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Board/Mat]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_carpetilla\\_mantel.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_carpetilla_mantel.pdf)
  - Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Game for children]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available at: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_juego\\_salud.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_juego_salud.pdf)
  - Consejo General de Colegios Oficiales de Farmacéuticos. Plenufar 2 [Leaflet for children]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_juego\\_salud.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_juego_salud.pdf)
  - Consejo General de Colegios Oficiales de Farmacéuticos. Report on Plenufar 2. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2000 [cited 2011 Feb 11]. Available from: [http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/\\$File/02\\_resultados.pdf](http://pfarma3.portalfarma.com/pfarma/taxonomia/general/gp000042.nsf/voDocumentos/233302F6FC268C6DC1257101003EDC3C/$File/02_resultados.pdf)
  - Consejo General de Colegios Oficiales de Farmacéuticos. Antecedentes de Plenufar 3 [History of Plenufar programme]. Madrid: Consejo General de Colegios Oficiales de Farmacéuticos; 2005 [cited 2011 Feb 11]. Available from: [http://www.portalfarma.com/pfarma/taxonomia/general/gp000002.nsf/voDocumento/s/1F75B7FF42AA2095C12570AE003B34EE/\\$File/0\\_antecedentes.pdf](http://www.portalfarma.com/pfarma/taxonomia/general/gp000002.nsf/voDocumento/s/1F75B7FF42AA2095C12570AE003B34EE/$File/0_antecedentes.pdf)

## VIII) Attention Deficit Hyperactivity Disorder (Seville, Spain)

The College of Pharmacists of Seville in collaboration with families of children affected by attention deficit hyperactivity disorder (ADHD) contributed to the social awareness of the disease through distribution of leaflets in pharmacies in Seville.

The messages of these leaflets were: Is it hard for your child to sit still? Does your child act without thinking first? Does your child start things without finishing them? If so, your child may have attention deficit hyperactivity disorder (ADHD). Nearly everyone demonstrates these behaviours at times, but ADHD lasts more than 6 months and causes problems at school, at home and in social situations. ADHD is more common in boys than girls, and it affects 3-5 percent of children in the United States. The principal characteristics of ADHD are inattention, hyperactivity and impulsivity. Children with ADHD have trouble paying attention, controlling impulsive behaviours (may act without thinking about what the result will be), and, in some cases, are overly active.

No one knows exactly what causes ADHD. It runs in families, so genetics may be a factor. A complete evaluation by a trained professional is the only way to know for sure if your child has ADHD. Treatment often includes the use of medications to control symptoms. Structure at home and at school is important and parenting classes or behavioural therapy may also help.

Being a teenager isn't always easy. Teens with ADHD can have a tough time. School may be a struggle, and some teens take too many risks or break rules, but like children with ADHD, teens can get better with treatment. Give your child guidance and understanding. A specialist can show you how to help your child make positive changes. Supporting your child helps everyone in your family. Also, talk to your child's teachers. Some children with ADHD can get special education services.

ADHD is a condition of the brain that makes it hard for children to control their behaviour. It is one of the most common chronic conditions of childhood. All children have behavioural problems at times. Children with ADHD have frequent, severe problems that interfere with their ability to live normal lives.

The Colegio de Farmacéuticos de Sevilla (Association of Pharmacists of Seville) has collaborated with the Andalusian Federation of Associations of Parents and Persons with Attention Deficit Disorders and Hyperactivity (FAHYDA) to disseminate these brochure and to promote the 2nd Gathering of Andalusian Family with ADHD, held in Marbella, on April 2008.

Pharmacists contributed not only to a greater participation in the meeting, but also to a greater social awareness of this disease by the patients of the pharmacies in Seville (Spain).

### **Bibliography:**

- El Colegio, con las familias de los niños con trastorno por déficit de atención e hiperactividad. Boletín Informativo del Real e Ilustre Colegio Oficial de Farmacéuticos de Sevilla 2008 Mar;71:9 [cited 2011 Feb 11]. Available from: [http://www.farmaceticosdesevilla.es/opencms/export/sites/default/Proyecto/proyecto/RICOFs/Publicaciones/Farmapress/Famxpress\\_71-2.pdf](http://www.farmaceticosdesevilla.es/opencms/export/sites/default/Proyecto/proyecto/RICOFs/Publicaciones/Farmapress/Famxpress_71-2.pdf)
- Colegio Oficial de Farmacéuticos de la provincial de Sevilla. Contribución a la calidad de vida in Memoria de Sostenibilidad 2008. Sevilla: Colegio Oficial de Farmacéuticos de la provincial de Sevilla; 2008 [cited 2011 Feb 11]. Available from:

[http://www.farmaceticosdesevilla.es/opencms/export/sites/default/Proyecto/proyecto/RICOFS/Informacion Interes/Memoria 2008-2.pdf](http://www.farmaceticosdesevilla.es/opencms/export/sites/default/Proyecto/proyecto/RICOFS/Informacion%20Interes/Memoria%202008-2.pdf)

## **IX) Pharmaceutical Care for Pregnant Women and Children (Nigeria)**

### **PHARMACISTS IMPROVED HEALTH OUTCOMES AND QUALITY OF LIFE OF PREGNANT WOMEN AND CHILDREN AT FEDERAL MEDICAL CENTRE, ABEOKUTA, OGUN STATE.**

Odunfa O.O\*, Owolabi O.D, Adebayo A.A, Oludiran O.A, Olofinjana O.A, Aboaba D.A

#### **Summary**

Pharmaceutical Maternal and Child Care Clinic activities have brought a new paradigm to the roles of pharmacists in tertiary hospitals. The intervention sought to determine the impact of pharmaceutical care (PC) on health outcomes of target patients measured by clinical, humanistic and economical indices between patients exposed and those not provided with PC.

#### **Study Setting, Sampling and Methodology:**

The Federal Medical Centre (FMC), Abeokuta, a tertiary hospital located in the South-West part of Nigeria. A 300-bed tertiary health facility with over 16 health departments offering primary, secondary and tertiary care to residents of Abeokuta and four neighbouring States. FMC has 110 resident doctors, 10 registered pharmacists and 56 medical consultants, as well as residency training in Obstetrics and Gynaecology, Internal Medicine, Family Medicine, Surgery and Paediatrics.

A descriptive cross sectional study which involved about 42 patients (20 exposed to pharmaceutical care and 22 on traditional care) attending the outpatient clinics of the obstetrics and gynaecology clinics over a period of 12 months (between September 2009 and September 2010) at the Federal Medical Centre, Abeokuta. They were seen during Pharmacist ward rounds, PC clinics run in the Pharmacy Department's counselling rooms and during the Prevention of Mother to Child Transmission of HIV/AIDS clinic days. Some cases however involved home visits.

During pregnancy, patient interview and counselling revolved around routine drugs use, glycaemia, BP, and STI screening, proper usage of mosquito nets, immunization and breastfeeding awareness, discouraging of self medication, Intermittent Preventive Therapy (IPT) and folic acid supplementation for pregnant women on antiepileptic drugs.

Postnatal care protocols related to discharge, bleeding, pain, fever, immunization, breastfeeding rates (adherence to HAART by HIV infected mothers who chose to breastfeed), weight monitoring of babies, and contraception awareness.

#### **Results**

Reduction in emergency visits to the hospital, prevention/cure of STIs and malaria, better pregnancy outcomes, awareness of determinants of illnesses, better quality of life, positive attitude, better knowledge about self care, satisfaction with service and cost savings all characterized those that received PC.

- 90%(n=18) had good pregnancy outcomes in the PC group versus 64%(n=14) in the traditional group.
- 80%(n=16) had proper knowledge and awareness of determinants of ill health in the PC group versus 18%(n=4) in the traditional group.
- 90%(n=18) had improved quality of life during pregnancy in the PC group versus 68%(n=15) in the traditional group .
- 95%(n=19) were satisfied with intervention in the PC group versus 41%(n=9) in the traditional group .
- 80%(n=16) said they derived cost savings when they avoided procurement of non prescription medicines in the PC group versus 32%(n=7) in the traditional group.

### **Limitations**

Individual patient waiting time increased for those exposed to PC. This generated a lot of complaints from patients who were in a hurry to leave the premises.

### **Conclusion**

PC was found to be superior to traditional care as evidenced by the benefits arising from this intervention. Pharmacists have been found to improve health outcomes of pregnant patients and children at the Federal Medical Centre. Continuing education, zeal and pro-activity lead to increased relevance of pharmacists as a member of the health care team.



## APPENDIX 2: EXTRACT OF THE FIP/WHO GUIDELINES ON GOOD PHARMACY PRACTICE: STANDARD FOR QUALITY OF PHARMACY SERVICES

[...]

### 5. Setting standards for good pharmacy practice

[...]

#### Role 1: Prepare, obtain, store, secure, distribute, administer, dispense and dispose of medical products

- Function A: Prepare extemporaneous drug preparations and medical products

*Minimum national standards should be established for these activities.*

- Pharmacists should ensure that medicine preparation areas are appropriately designed to permit ease of extemporaneous preparations and are maintained in a manner that minimizes the potential for medication errors and assures the cleanliness and safety of medical products.
- Pharmacists should ensure that compounded medicines are consistently prepared to comply with written formulas and quality standards for raw materials, equipment and preparation processes, including sterility where appropriate.

- Function B: Obtain, store and secure medicine preparations and medical products

*Minimum national standards should be established for these activities.*

- Pharmacists who are responsible for procurement should ensure that the procurement process is transparent, professional and ethical so as to promote equity and access and to ensure accountability to relevant governing and legal entities.
- Pharmacists who are responsible for procurement should ensure that procurement is supported by strong quality assurance principles to assure that substandard, adulterated, unlicensed and spurious/falsely-labelled/falsified/counterfeit medicines are not procured or allowed into the system.
- Pharmacists who are responsible for procurement should ensure that procurement is supported by a reliable information system which provides accurate, timely and accessible information.
- Pharmacists should establish contingency plans for shortages of medicines and for purchases in emergencies.
- Pharmacists should assure that proper storage conditions are provided for all medicines, especially for controlled substances, used in the pharmacy or health-care facility.



- Function C: Distribute medicine preparations and medical products
  - Minimum national standards should be established for these activities.*
    - Pharmacists should ensure that all medical products, including medicine samples, are handled and distributed in a manner that assures reliability and safety of the medicine supply.
    - Pharmacists should establish an effective distribution system which includes a written procedure, to recall promptly and effectively medical products known or suspected to be defective or spurious/false-labelled/falsified/counterfeit, with a designated person(s) responsible for recalls.
    - Pharmacists should develop with manufacturers, wholesalers and government agencies (where appropriate) an access plan for uninterrupted supply of essential medicines as part of a disaster or pandemic preparedness strategy.
    - As part of a disaster or pandemic preparedness strategy, national medicines regulatory agencies may introduce new medicines which are authorized for marketing with limited safety data; pharmacists have a responsibility to be aware of the safety issues and to institute necessary mechanisms for monitoring occurrence of adverse events.
  
- Function D: Administration of medicines, vaccines and other injectable medications
  - Minimum national standards should be established for these activities.*
    - Pharmacists should have a role in the preparation and administration of medicines, in establishing procedures in their work settings with respect to the administration, and in monitoring the outcomes of medication administration.
    - Pharmacists should have an educator, facilitator and immunizer role, thus contributing to the prevention of diseases through participation in vaccination programmes, by ensuring vaccination coverage and by also ensuring vaccine safety.
    - Pharmacists should participate in directly observed therapy (DOT) programmes in areas such as the management of drug addiction, HIV/AIDS, tuberculosis and sexually transmitted diseases, where applicable.
  
- Function E: Dispensing of medical products
  - Minimum national standards should be established for these activities.*
    - Pharmacists should ensure that appropriate facilities, trained personnel, standard dispensing practices and documentation procedures are in place in the pharmacy for the supply and dispensing of prescribed medicines and other health-care products.
    - Pharmacists should assess and evaluate all paper or electronic prescriptions received, considering the therapeutic, social, economic and legal aspects of the prescribed indication(s) before supplying medical products to the patient. Where possible, generic substitution is recommended.
    - Pharmacists should ensure patient confidentiality at the point of dispensing medical products and should provide advice to ensure that the patient receives

and understands sufficient written and oral information to derive maximum benefit for the treatment.

- Function F: Dispose of medicine preparations and medical products

*Minimum national standards should be established for these activities.*

- Pharmacists should ensure that regular monitoring of the medicines inventory is conducted and should always include medicines samples in the process of periodic inspection for expiration dates and removal of outdated stock.
- Pharmacists should ensure that recalled medical products, including medicines samples, are immediately stored separately for subsequent disposal and prevented from being available for further dispensing or distribution.
- Pharmacists should establish a safe way of medicines waste disposal at the hospital and/or community pharmacy so that patients and the public can be encouraged to return their expired or unwanted medicines and medical devices. Alternatively, pharmacists should provide appropriate information to patients on how to safely dispose of expired or unwanted medicines.

## **Role 2: Provide effective medication therapy management<sup>b</sup>**

- Function A: Assess patient health status and needs

*Minimum national standards should be established for these activities.*

- Pharmacists should ensure that health management, disease prevention and healthy lifestyle behaviour are incorporated into the patient assessment and care process.
- Pharmacists should acknowledge unique patient considerations such as education level, cultural beliefs, literacy, native language and physical and mental capacity in all individual patient assessments.

- Function B: Manage patient medication therapy

*Minimum national standards should be established for these activities.*

- Pharmacists should maintain access to an appropriate evidence base relating to the safe, rational and cost-effective use of medicines such as reference books on medicines, journals, national essential medicines lists and standard treatment guidelines.
- Pharmacists should ensure that medicine formulary system(s) (local, regional and/or national) are linked to standard treatment guidelines, protocols and treatment pathways based on the best available evidence.
- Pharmacists should have a key role in educating prescribers on the access to and evidence for optimal and appropriate use of medicines including the required monitoring parameters and prescribing adjustments. Where appropriate, pharmacists should provide advice or recommendations to the

---

<sup>b</sup> Medication therapy management is a distinct service or group of services that optimize therapeutic outcomes for individual patients. Medication therapy management services are independent of, but can occur in conjunction with, the provision of a medication product.

prescriber on medicine therapy, including the selection of the appropriate medication or dosage.

- Pharmacists should have access to, contribute to and use all necessary clinical and patient data to coordinate effective medication therapy management, especially when multiple health-care practitioners are involved in the patient’s medication therapy, and intervene if necessary.
- Pharmacists should establish a standard operating procedure for referrals to physicians, specialists or other health-care providers, where appropriate.
- Pharmacists should provide continuity of care by transferring information on patients’ medicines as patients move between sectors of care.

- **Function C: Monitor patient progress and outcomes**

*Minimum national standards should be established for these activities.*

- Pharmacists should consider patient diagnosis and patient-specific needs when assessing patient response to medicine therapy and intervene if necessary.
- Pharmacists should document necessary clinical and patient data to assess and monitor medication therapy and to track patients’ therapeutic outcomes.
- Pharmacists should perform point-of-care testing for patients in order to monitor and adjust therapy, when needed.

- **Function D: Provide information about medicines and health related issues**

*Minimum national standards should be established for these activities.*

- Pharmacists should ensure that in every pharmacy there is a suitable place for discussing confidential information with the customers and patients.
- Pharmacists should provide sufficient health, disease and medicine-specific information to patients for their participation in their decision-making process regarding a comprehensive care management plan.
- This information should aim at supporting adherence to treatment and empowerment of the patient.
- Pharmacists should be proactive in reducing antimicrobial resistance by providing information about the appropriate use of antimicrobials to consumers and prescribers.

### **Role 3: Maintain and improve professional performance**

- **Function A: Plan and implement continuing professional development<sup>c</sup> strategies to improve current and future performance**

*Minimum national standards should be established for these activities.*

- Pharmacists should perceive continuing education as being lifelong and be able to demonstrate evidence of continuing education or continuing professional development to improve clinical knowledge, skills and performance.

---

<sup>c</sup> The concept of continuing professional development (CPD) can be defined as “the responsibility of individual pharmacists for systematic maintenance, development and broadening of knowledge, skills and attitudes, to ensure continuing competence as a professional, throughout their careers.”

- Pharmacists should take steps to update their knowledge and skills about complementary and alternative therapies such as traditional Chinese medicines, health supplements, acupuncture, homeopathy and naturopathy.
- Pharmacists should take steps to update their knowledge and be engaged in implementation of new technology and automation in pharmacy practice, where feasible.
- Pharmacists should take steps to become informed and update their knowledge on changes to information on medical products.

#### **Role 4: Contribute to improve effectiveness of the health care system and public health**

- Function A: Disseminate evaluated information about medicines and various aspects of self care

*Minimum national standards should be established for these activities.*

- Pharmacists should ensure that the information provided to patients, other health-care professionals and the public is evidence-based, objective, understandable, non-promotional, accurate and appropriate.
- Pharmacists should develop and/or use educational materials for health management, health promotion and disease prevention programmes that are applicable to a wide range of patient populations, age groups and health literacy levels.
- Pharmacists should educate patients on how to evaluate and use web-based or other forms of health-care information (including medicines information) and strongly encourage them to be advised by a pharmacist regarding the information they find, particularly if obtained from the Internet.
- Pharmacists should assist patients and their care providers to obtain and critically analyse information to meet their individual needs.

- Function B: Engage in preventive care activities and services

*Minimum national standards should be established for these activities.*

- Pharmacists should engage in preventive care activities that promote public health and prevent disease, i.e. in areas such as smoking cessation, infectious and sexually transmitted diseases.
- Pharmacists should provide point-of-care testing, where applicable, and other health screening activities for patients at higher risk of disease.

- Function C: Comply with national professional obligations, guidelines and legislations

*Minimum national standards should be established for these activities.*

- Pharmacists should take steps to ensure that they comply with the provisions of a national code of ethics for pharmacists.

- Function D: Advocate and support national policies that promote improved health outcomes
  - Minimum national standards should be established for these activities.*
  - Pharmacists should contribute to public and professional groups to promote, evaluate and improve health in the community
  - Pharmacists should collaborate with other health-care professionals in their efforts to improve health outcomes.