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Review Article

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Review on Benefits of Drug Information Center Services: A New Transpiring Practice to Health Care Professionals in Hospitals

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ABSTRACT

Hospital is a multiple health care institution provides patient care with the support of specialized medical and Para medical team. The drug information center (DIC) plays a key role in hospitals solving several drug problems and releases the news letters relates to information about the drugs, diseases, patient safety and cost effectiveness of drug DIC guides, safeguards the health care professionals to the right practice of the patient's community. It offers a learning based center for health care professionals to acquire skills and knowledge necessary for conducting research and delivery of exact evidence based drug information to the community. The drug information center routinely receives queries from hospital staff, patients and responds to queries regarding adverse drug reactions, drug interactions, pharmacokinetic parameters of drugs, information on new drugs available in the market. The drug information centers should establish in every teaching hospitals, community pharmacies and patient counseling centers with sufficient resources to meet the needs of the community. The drug information center in charge should be able to assess the nature of query help of several drug databases (Micromedex) send the information to their required time duration to meet the challenge of timely information. The Drug information center will provides the written and verbal information about drugs to the patients and health care practitioners in the hospital. The drug information center allows the access to clinical knowledge, libraries and research facilities and educational activities to patients and health care professionals with in the hospital Practice.

Keywords: Adverse drug reactions; Micromedex; Drug interactions; Patient counseling

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INTRODUCTION

Drug
It is defined as a substance or mixture of substances or medical equipments or supplies, used for human and animal health care to diagnosis, treatment mitigation or preventions of diseases or symptoms.

Drug information center
A branch in the hospital designed for receiving, collecting, analyzing, and providing unbiased, accurate and up-to-date information about drugs and their use [1].

Drug information service
The activities, functions through which centers achieve their objectives and which constitute their programs of work collaborated with various departments in the hospitals.

Purpose of drug information center

- To provide comprehensive, objective and evaluated information on drugs with a view to enhancing the rational use of drugs.

- To disseminate technical, scientific & objective information to health care providers.
- To disseminate appropriate drug information to the general public.
- To generate, collect, analyze and maintain drug information data.
- To design produce and distribute drug information materials [2].
- To give appropriate information on toxicology and poisoning.

REVIEW

Need for drug information services in hospitals

The past decades, the smaller range of available drugs limited need for drug information but now new drugs and new modalities of the treatment being introduced. The most developing countries like India suffer from lack of awareness and in-adequate drug information due to various health care Problems. In India community having low income levels populations and the multiple health care system practices and lacking of awareness about the risks and benefits of drug therapy paves the way for a good clinical pharmacy practice development [3]. There is potential for clinical pharmacist to fill this gap between medical profession and to the community the establishments of drug information services are required. The drug information query is referred by doctors, nurses and patients. The patients likely to ask the questions regarding drugs about dosage, storage, usage, adverse drug reactions and drug-drug interactions about the drugs they have been prescribed to get the up dated information from the drug information centers in the hospitals. Drug information queries may also comes from nurses and other hospital staff including pharmacist with in the hospital practice. The drug information center in charge should be able to assess the nature of query their requisition time duration, send the information to meet the challenge of timely information. The drug center should train the health care professionals for its own operational function and it is needed for professionals in the skilled area of communication with public.

The Drug information will provides written or verbal information about drugs information to the patients and health care practitioners. The service offers collecting, reviewing, evaluating, indexing and distributing information on drugs to health care workers [4]. This allows access to clinical experience; libraries, research facilities and educational activities collaborated with respective departments within the hospital practice**.** Hospital is an institution for the care and treatment of the sick, wounded people for the study of the diseases, and for the training of the various health care professionals.

Types of hospitals

General hospitals:

These hospitals offer treatment for common diseases.

Specialized hospitals:

These hospitals focus on giving medical and nursing care in a specific area, e.g., ophthalmic hospital (deals with eye related problems), orthopaedic hospital (deals with bone related problems), cardiac hospital (deals with heart related problems), etc.

Isolated hospitals:

This is a hospital in which patients requiring isolation and suffering from communicable diseases are taken care of sick patients.

Teaching hospital:

It is attached with district head quarter's hospital attached with medical college provides teaching and training of doctors for example, Medical Colleges [5].

Rural hospitals:

These hospitals are located in rural areas, permanently staffed by at least one or more physicians in the practice.

Departments in hospitals (Tables 1-3)

- Outpatient department
- Inpatient department

Table 1: The medical departments in the hospital may include following

Internal Diseases Department	Gynecology Department	Emergency Department
Surgery Department	Pediatrics Department	Nursing Department
Anesthesia	Dentistry Department	Emergency Department

Table 2: Supporting departments in the hospital

Catering and Food Services	Finance Department	Medical Maintenance and Engineering	Pharmacy department	Social Work Department
Central Disinfection and Sterilization	Human Resources Department	Medical Records Department	Physiotherapy Department	Transportation Department
Cleaning and Laundry	Laboratory and Blood Bank	Patients Services Department	Public Relations Department	X-Ray Department

Table 3: The following clinical professionals are available in a hospital

Doctors	Medical Lab Technician
Nurses	X-ray Technician
Pharmacist	Physiotherapist, Dietician

Functions of hospital

There are many services provided by these hospitals they are:

- Diagnosing and treating the several diseases.
- Dispensing and distribution of medications to the community.
- Immunisation for children against many preventable diseases in the community.
- Family planning and maternity care through special departments.
- Emergency care, Health Education training and Research, Patient care services.

Types of drug queries in the hospital (Table 4)

Table 4: Information about types of drug queries

Drugs mechanism of action	Newer drugs list
Drug dose	Drug of choice
Drug interactions	Drug safety and efficacy
Adverse drug reactions	Drug cost
Contraindications	Drug brands
Warnings	Disease profile
Precautions	Dose calculations
Drug combinations	Newer drugs list
Dose adjustments	Dose fixing information

Services offered by drug information centers

- Patient care services
- Poison information services

Who can access the drug information services?

- Doctors
- Physicians
- Nurses
- Students
- Medical Professionals
- Researchers in Pharmacy Practice area
- Drugs and therapeutic committee members
- Pharm. D and Pharmacy Practice Professionals

Classification of drug information centers

It can be mainly classified into three types it includes:

- Hospital based drug Information Center
- Industry based drug Information Center
- Community based drug Information Center

Facilities of drug information center

- Shall have its own office with adequate size and furniture.
- Shall have a direct telephone line and Internet access.
- Shall be equipped with computer, the required software and necessary reference materials [6].

National, international and independent journals and bulletins

- Ethiopian Pharmaceutical Journal
- Ethiopian Medical Journal
- Ethiopian Journal of Health Development
- American Journal of Hospital Pharmacy or American Journal of Health System Pharmacy
- British Medical Journal
- Journal of Pharmaceutical Sciences
- Journal of American Pharmaceutical Association
- Journal of American Medical Association
- New England Journal of Medicine
- Lancet
- Australian Prescriber
- The British National Formulary
- East African Medical Journal

Drug information services global scenario

Australia:

In Australia, most DICs are located in hospitals and associated with clinical pharmacy programmes. The National Prescribing Service (NPS) is an independent, government funded organization to promote the quality of medicines for patient care and consumer education.

United Kingdom:

The United Kingdom Medicines Information Service (UKMi) is a National Health Service (NHS)-funded, pharmacy-based service available to all health-care professionals in primary and secondary care.

USA (United States of America):

The first drug information center was opened at the University of Kentucky Medical Center in 1964. The Drug Information Association (DIA) was established in Maryland, USA. In 1958 the American Association of Poison Control Centers (AAPCC) was founded to promote cooperation between poison centers in different cities and to standardize the operation of these centers [7].

Canada:

The Ottawa Hospital Drug Information Service is part of the Pharmacy Department and answers the requests from all hospital staff but most commonly receive questions from physicians, pharmacists, pharmacy technicians, nurses and health-care professionals in training.

Malaysia:

The National Poison Centre (Pusat Racun Negara) was set up in 1994 culminating on the services provided by the Integrated Drug and Poison Information Services (IDPIS), Universiti Sains Malaysia since 1982.

Singapore:

The Drug and Poison Information centre in Singapore was established in April 2004 to provide life saving services to the citizens of Singapore 7 days a week, 24 hours a day. The Information is delivered to healthcare professionals, industries and members of the public.

Japan:
Nahoko Kurosawa is a Professor of Pharmacy, at School of Pharmacy, Hokkaido Pharmaceutical University. The University was established in 1974, in Hokkaido, the northern island of Japan. After training in Drug Information Services and Pharmaceutical Care at the Clinical Center, National Institutes of Health in Bethesda, USA between 1994 and 1995.

India:
The pioneers in providing drug information in India are the Karnataka State Pharmacy Council (KSPC), SRM College of Pharmacy, SRM University, Chennai, JSS College of Pharmacy, Mysore, and Ooty, Thiruvananthapuram medical colleges. There are some specialized centres that provide information exclusively on poisoning, e.g. Poison Information Centre, All India Institute of Medical Sciences (AIIMS), New Delhi, JIPMER, Pondicherry. Most of the DICs are attached to teaching hospitals in collaboration with pharmacy schools running clinical pharmacy programmes in India [8].

European countries:
The European Association of Poison Centres and Clinical Toxicologists (EAPCCT) was founded in Tours, France, 1964.

Saudi Arabia:
National Drug Information Center has started providing services since January 2013 and started answering public and professional inquires through Ministry of Health Hotline Calling Services (937) since December 2013. Ten on call clinical pharmacist and expert trained pharmacist over 24/7 received calls asking about drug information, through manual documentation system of drug information inquiries.

Kuwait:
Over the past few years, there has been a modernization of pharmaceutical services in Kuwait. In 1983 a drug information center was opened. A one-year postgraduate, long-distance program leading to a diploma in clinical pharmacy was started in October 1987 in cooperation with Queen's University of Belfast, Ireland. Pharmacist and physician tutors were assigned to supervise students in the major hospitals in Kuwait [8].

Objectives of drug information centers

- To define the minimum requirements for establishing Drug Information Center at different levels.
- To guide in recognizing the importance of monitoring and evaluation in maintaining the quality of drug information disseminated.
- To serve as a guide for the centers.
- To provide an organized database of specialized information on medicines and therapeutics to meet the drug information needs of practitioners.
- To educate pharmacy students to serve as effective providers of medications information.
- To provide accurate and unbiased medicines information service to the pharmacists, physicians and other health care professionals in the hospital and community.
- To promote patient care through rational use of medicines.

Benefits of drug information services

- Reducing the drug related problems.
- Providing accurate information services to various health care professionals.
- Increased productivity for pharmacists and prescribers through less frequent calls to doctors to check prescriptions.
- Improving patient compliance and patient safety.
- Minimizing the drug related issues to the patients.
- Improving the medication adherence.
- Improve the distribution of the drugs without any problems.
- Reduced medication abuse and improved drug cost management.
- Increased patient and provider satisfaction.

Goals of drug information centers

- To provide accurate and timely responses to medical professionals.
- Inform the community about benefits of drug centers.
- Provide the evidence-based use of medications that reduce drug problems.
- Improve the drug's safety and efficacy in practice.
- Developing the research in drug information, medication safety in the hospitals.
- Educate pharmacy students and medical community in drug information practice with in the hospital location [9].

Drug information clients by category (Table 5)

- Health professionals
- Researcher
- Regulatory body
- General public

Table 5: Drug information category

General product information	Toxicology
Therapeutic efficacy	Drug dosing (both adult, child)
Pharmaceutical Information	Special precautions
Indications of the drug	Drugs used in childhood, pregnancy, lactation, old age, and disease conditions
Adverse effects of drugs	Rational drug use
Contraindications	Pharmacokinetics of drugs

List of drug information centers run at state pharmacy councils in India (Regional)

- Drug Information Center, Maharashtra State Pharmacy Council, Maharashtra
- Andhra Pradesh state pharmacy council, Andhra Pradesh
- Drug information center, Jaipur, Rajasthan
- Drug information center, Raipur, Chhattisgarh
- Karnataka state pharmacy council (KSPC), Bangalore, Karnataka
- Drug information center, Jaipur, Rajasthan
- Drug information center, Raipur, Chhattisgarh
- Drug information center, Panaji, Goa
- Drug information center, Dibrugarh, Assam

Other drug, poison or alcohol information centers in India

- Alcohol and drug information center (ADIC), Trivandrum, Kerala
- Bowring and Lady Curzon hospital, Bangalore
- Bulletin on drug and health information (BIDI), Kolkata
- Community development medicinal unit (CDMU) documentation center, Calcutta
- Christian medical college hospital Vellore, Tamilnadu
- Department of pharmacy practice, national institute of pharmaceutical education and research (NIPER), Chandigarh
- Drug information center, division of pharmacy practice department of pharmacy, Annamalai University
- SRM Medical College Hospital and Research center, Kattankulathur
- Drug information center, (KSPC), Bowring and Lady Curzon hospital, Bangalore, Karnataka
- Drug information center, (KSPC), Victoria hospital, Bangalore, Karnataka
- Jawaharlal Nehru medical college hospital (JNMC), Belgaum, Karnataka
- JIPMER drug information center, JIPMER hospital Gorimedu, Pondicherry
- JSS, Mysore
- JSS, Ooty
- Kasturba medical college (KMC), Manipal, Karnataka
- Kempagowda institute of medical sciences (KIMS), Bangalore, Karnataka
- N.R.S. medical college and hospital, Calcutta
- National poisons information center, all India institute of medical sciences (AIIMS), Ansari nagar, New Delhi

- Pharma information center, Chennai, Tamilnadu
- Poison control center and department of analytical toxicology, amrita institute of medical sciences and research, Cochin
- Poison control, training and research center, government general hospital Chennai
- Poison information center, national institute of occupational health, Ahmadabad
- Sri Ramachandra Hospital, Porur, Chennai
- Sri Ramakrishna mission hospital, Coimbatore, Tamilnadu
- Toxicology and IMCU unit, government general hospital, Chennai
- Trivandrum medical college, Trivandrum, Kerala

Drug information resources factual and reference databases (Table 6)
ChemIDPlus National Library of Medicine (NLM):
Contains over 388,000 chemical records; searchable by Name, Synonym, CAS Registry Number, Molecular formula, Classification Code, Locator Code, Structure, Toxicity and/or Physical properties [10].

Clinical trials:
Information for located clinical trials for a wide range of diseases and conditions covers thousands of trials sponsored by National Institutes of Health and other government agencies, pharmaceutical companies, universities, foundations and organizations.

Drug expert:
It delivers environmental, health and safety oriented data on thousands of pharmaceutical substances, drawing from US and European sources [11].

Drug information portal:
It covers over 17,000 drugs from entry into clinical trials through entry in the market place. Resources include the National Library of Medicine (NLM) search systems useful in searching for a drug, and other NIH and government resources, such as FDA and CDC.

Drugs and lactation database (LactMed) via Toxnet:
A peer-reviewed source of drugs to which breastfeeding mothers may be exposed and includes data of maternal and infant levels of drugs, possible effects on breastfed infants, lactation and alternate drugs are considered [12].

Lexi-Comp online:
Access to more than 70,000 uniquely cited references and 500,000 links to primary research on drugs, including analysis of drug and herbal interactions, off-label uses and dosing options, drug Identification, and patient information leaflets in up to 18 languages.

Micromedex:
It Provides summaries and detailed monographs for drugs, diseases, alternative medicine, toxicological managements, reproductive risks, and emergency care.

Table 6: Fewer drug information searching online resources information

Pub med	Cochrane library	FDA drugs	Health today
Med scape	Health line	e-Medicine	CIMS
Drug dex	Drug bank	web MD	Patient info
Dion	R_x List	NCBI (national center for biotechnology)	Medicine net,
BNF	Medical news today	Drug Politics	AHFS drug information

Drug information databases
DRUGDEX® system:
It gives information about dosage, pharmacokinetics, cautions, interactions, clinical applications, and comparative drug efficacy.

Martindale:
It is published by the Royal Pharmaceutical Society of Great Britain.

Index nominum:
It is the international drug directory of generic substances, drug trade names, synonyms, chemical formulas, therapeutic classes, and manufacturer information.

Drug points system (Drug Summary Information):
It will brief the highlights of treatment, diagnosis, and key point information.

Toxicology databases information
POISINDEX:
Identifies the ingredients of over a million different commercial, biological substances, including common household products, industrial products and chemicals [13].

IDENTIDEX system:
It facilitates the quick, accurate identification of unknown drugs by imprint code or slang term. A match is further confirmed by physical characteristic descriptions and photographs, and accompanied by ingredient and manufacturer data.

REPRORISK reproductive risk information
Provides information on the reproductive risks of drugs, chemicals, and physical and environmental agents. Risks to females, males, and unborn children are discussed.

DISEASEDEX:
It covers all aspects of care including diagnosis, management highlights, prognosis, when to refer, follow-up, advising the patient, and prevention and screening.

IV INDEX system:
Provides information on drug-drug, food-drug, drug-disease, drug-ethanol, and drug-laboratory assay interactions, as well as IV compatibility [14].

Alt Care Dex:
Alternative Medicine system includes appropriate information on dietary supplements (herbal medicines, vitamins, minerals, etc.) and complementary/alternative therapies.

Orange book (FDA):
Approved Drug Products with Therapeutic Equivalence Evaluations, known as the Orange Book, identifies drug products approved on the basis of safety and effectiveness.

Natural medicines comprehensive database:
Provides information about new interactions and safety concerns.

Natural standard:
Provides the information about complementary and alternative therapies and information is created that is evidenced-based, consensus-based and peer reviewed.

Up to date:
The literature reviews are available in many medical and patient care disciplines covering drug information sectors; what is new in drug therapy, practice changing updates, general drug information for international, natural, pediatric and patient information.
AHFS drug information (American Hospital Formulary Service)
It includes information on prescription, oral contraceptives, ophthalmic, dermatologic drugs plus vitamins and vaccines, specific dosage and administration information, extensive off-label uses and dosing options, expanded and

revised content, therapeutic recommendations supported from evidence, pharmacology and pharmacokinetics, preparations, chemistry and stability, interactions, adverse reactions, cautions and toxicity [15].

British pharmacopoeia
Standards for UK pharmaceutical and medicinal substances which includes veterinary monographs, test methods, infrared spectra and supplementary information.

US pharmacopoeia
It contains standards for medicines, dosage forms, drug substances, excipients, medical devices, and dietary supplements.

Evidenced-based (EBM) databases
Cochrane library:
Provides information and evidence to support health care decision making and it includes systematic reviews, clinical trials and more.

MD consults:
It comprises of medical reference books, journals and clinics, MEDLINE. The records include information on; indication/dosage, administration, contradictions/precautions, and interactions, adverse reactions, monitoring parameters, chemical structure and photographs.

Drugs in development data
Pipeline:
Pipeline is a search tools allow conduction extensive searches on disease, status and stage of development, company name, therapeutic class, mechanism of action and biological target.

EMBASE:
A biomedical and pharmaceutical database having information on drug research, pharmacology, pharmaceutics, pharmacy, drug side effects and interactions, toxicology, human medicine (clinical and experimental), basic biological sciences, biotechnology, biomedical, medical devices, engineering and instrumentation, health policy and management, pharmacoeconomics.

PubMed:
It is a service of the National Library of Medicine includes links to full text review and research articles and other related resources.

Scopus:
Search for scientific, technical, medical, and social science literature from more journals.

Drug information resources can be categorized into

- Primary (journals)
- Secondary (indexing and abstracting)
- Tertiary (general reference books)

Primary sources:
These include journal publications on drug-related subjects, such as reports of clinical drug trials, case reports, and pharmacological research (Table 7).

Table 7: Primary sources of drug information resources

British Medical Journal	British Journal of Clinical Pharmacology,
New England Journal of Medicine	American Journal of Health Systems Pharmacy
Annal's of InternalMedinine	Lancet
British Journal of Pharmacy and Pharmacology	Indian Medical Journal
Clinical Pharmacy and therapeutics	Journal of the Association of Physicians of India

Secondary sources:

Function as a guide to or review of the primary literature. Secondary sources include review articles, meta-analyses, indexes (Index Medicus), abstracts (International Pharmaceutical Abstracts), and combinations of abstracts and full-text reprints (Table 8).

Table 8: Secondary sources of drug information resources

Medline	Martindale
International Pharmaceutical Abstracts	Poisindex
Chemical Abstracts	Index Medicus
IOWA drug Information Service	Martindale
Drugdex	The Medical Letter,
Medline	lowa Drug Information Services (IDIS),
WHO Drug Information,	Adverse Drug Reaction Bulletins

Tertiary sources:

Present documented information in a condensed format. Examples include formulary manuals, standard treatment manuals, textbooks, general reference books, drug bulletins, and drug compendia [16] (Table 9).

Table 9: Tertiary sources of drug information resources

Remington's text book	Up to Date
Handbook of Nonprescription Drugs	Pharmacist's Letter
Martindale drug reference	Natural Medicines Comprehensive
Lexi Comp	FDA.gov
MICROMEDEX	CDC.gov

Modified systematic approach to answering drug information questions in the hospital

Step 1: Secure demographics of requestor:

The clinical Pharmacist should keep the information about the requestor and his background research profile, details and preserve the documents for conducting the research work.

Step 2: Obtain background information:

Clinical Pharmacist to collect the information about the Provider information like education details and purpose of query. The collected information utilized appropriately to respond efficiently to queries.

Step 3: Determine and categorize the ultimate question:

The queries about drug uses were received from requestors and providing the exact response to received queries. It is essential in the benefits and utilization of systemic approach.

Step 4: Develop strategy and conduct search:

The pharmacist should select and prioritize resources based on the probability of locating the desired information rights to establish the research. If the query is finalized it will prompted to search in the proper resource to proceed the research.

Step 5: Perform evaluation, analysis, and synthesis:

The pharmacist should confirm information with other references to assure consistency between various resources and apply the techniques and skills for literature evaluation and clinical application for statistical analysis helps for better understanding of the research.

Step 6: Formulate and provide response:

The clinical pharmacist should refer the various literatures related to the research and provide the referred information to the professional community [17].

Step 7: Conduct follow-up and documentation:

It is the process of verifying the appropriateness, correctness, and completeness of a response to patient request. It is through approaching, mail survey, phone call, written communication. The documentation is essential for reducing mistakes and promoting the continuous service. The documents was procured with Logbook, Computer database and beneficial for patients health policies.

CONCLUSION

Drug information center services will regulate the drugs and patients related issues in the hospital. The center will collaborate with various departments and professionals in the hospital and distribute the information timely manner and halt the drug problems. The proper development as well as awareness is required for continuous practice of these services in hospital is needed. Establishing drug information centers in the hospitals, can promote the quality as well as safety of drug information services to the community. We conclude that every hospital in the country establish the setups in the hospital and promote quality of care towards community. The clinical pharmacist team should have challenging ability towards better practice, research, education and patient safety in the hospitals. In future every hospital in the country relies on these services and strengthens building the community free from health care issues.

REFERENCES

[1] Promoting rational use of medicines: Core components. Geneva: WHO. **2002**.
[2] S Venkatraghavan; M Rama; DA Leelavathi. *Int J Pharm Tech Res*. **2010**, 2, 390-403.
[3] G Beena; GM Padma. *Ind J Pharmacol*. **2005**, 37, 315-318.
[4] KN Hansen, MC Nahata, G Parthasarathi. Drug Information. In: Rajendran SD, editor. A textbook of clinical pharmacy practice, essential concepts and skills, 1st edition,: Orient Longman, India, **2004**, 267-286.
[5] ME Joy; CJ Arana; GR Gallo. *Am J Hosp Pharm*. **1986**, 43, 1226-1229.
[6] A Llerena; B Ohman; G Alvan. *Eur J Clin Pharmacol*. **1995**, 49, 87-89.
[7] KM Shields, E Lust. Drug information resources. In: Malone PM, editor. Drug Information: A Guide for Pharmacists, 3rd edition, McGraw Hill Inc, New York, NY, **2006**, 61.
[8] P Nibu; M Ramesh; G Parthasarathi. *Aus J Hos Pharm*. **2001**, 2, 144-145.
[9] E Roma; C Planells; A Carrera; AC Cercos; S Sanchez; C Gallego. *Eur Hosp Pharm*. **1995**, 1, 61-66.
[10] Drug Information Center Karnataka State Pharmacy Council, Setting up of Drug Information Centers in selected States in India, June, Bangalore, **2007**, (8-12), 5-6.
[11] http://www.shpa.org.au/lib/pdf/practice_standards/drug_info_ro.pdf
[12] American Association of Poison Control Centers (AAPCC) National Poison Data System (NPDS) Annual Report, **2009**.
[13] E Press; R Mellins. *Am J Public Health*. **1954**, 44(12), 1515-1525.
[14] http://www.poisons.co.nz/index.php
[15] http://www.schn.health.nsw.gov.au/parents-and-carers/our-services/poisons-information-centre/chw
[16] http://www.aapcc.org/
[17] http://www.who.int/gho/phe/chemical_safety/poisons_centres/en/