Pharmacy Projects
Abstracts

Dedicated
to
Professor Steve Hudson

a colleague, educator, mentor,
innovator, passionate contributor to clinical
pharmacy teaching and research
in Malta and in the International network

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University of Malta
2011
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Foreword

The Pharmacy Symposium is a showcase for students to present the work that they have carried out during the course of pharmacy on their pharmacy practice project. The final year students present outcomes and results of their project which is their introduction to the research world of pharmacy. The second, third and fourth year students present their work-in-progress. The areas covered place an emphasis on pharmaceutical care including clinical pharmacy aspects exposing the many pharmacist interventions spanning pharmacist advice to point-of-care testing. Quality systems and patient safety, including validation aspects, are a substantial feature in the project titles. Experience in the dissemination of information such as development of formularies, a pharmacy journal and health promotion media, with the presentation of samples of the published work, form an integral part of the projects. Pharmacy administration and pharmacoeconomic aspects make valuable and lively contributions to the developments of pharmaceutical policy and access to medicines. The healthy relations of the department of pharmacy with the pharmaceutical industry are evidenced by the projects related to the industry ranging from stability studies to the development of standard operating procedures for a particular scenario. Drug design, clinical analysis and drug distribution systems indicate areas of research interest associated with the department of pharmacy for a number of years.

Professor Anthony Serracino-Inglott
Pharmacy Practice Projects Co-ordinator

Introduction

Pharmacists are fundamental players in meeting the needs of the society in which they practice both at an individual patient or consumer level, as well as in a broader sense at the population level. National and societal needs and priorities vary from country to country with many factors accounting for this diversity including cultural, historical and geographical factors.

Medication is becoming more complex with the introduction of innovative drugs including biological agents that require greater patient support structures. The population is ageing leading to an increasing number of patients on chronic medication. The concept of prophylaxis of chronic disease, particularly relating to cardiovascular disease, gains ground. Requirements for accountability of outcomes of drug therapy are receiving more attention. In this scenario, pharmacists are required to participate in healthcare delivery at primary, secondary and tertiary care settings to improve the rational, safe and cost-effective use of drugs. In the local scenario this is being experienced both in the Government sector and in the private community pharmacies. In the Government Pharmaceutical Services, pharmacists are required to participate in a high level of patient care and there is an identified need to rapidly expand the clinical pharmacy services to encompass additional areas where to-date the clinical pharmacist input is desirable. In the private sector, professional services to support patients in responding to minor ailments and in managing chronic therapy, including point-of-care diagnostic services are being developed. In addition, with the implementation of the Pharmacy-Of-Your-Choice (POYC) scheme, the community pharmacist is required to offer clinical pharmacy services related to chronic disease and specialised drug therapy.

At the same time as these developments are taking place, the pharmaceutical industry is expanding fast in Malta. This is seen as a significant contribution to Malta’s economic growth. Such a development relies heavily on the availability of technical, qualified human resources including pharmacists who are particularly required in the functions of research and development, production, quality assurance, quality control, pharmaco vigilance, regulatory affairs and the distribution of medicinal products.

The benefits that can accrue to society through the versatility of pharmacists by being able to function both in the clinical and in the industrial aspects are recognised by the Department of Pharmacy of the Faculty of Medicine and Surgery. To ensure that the present and future needs of society are met with, the Department
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of Pharmacy is developing a strategic plan. This strategic plan endeavours to provide an educational design to develop manpower for a diversity of settings namely community, hospital and industry across varying levels of service provision and competence (graduates in pharmaceutical technology, pharmacists) and at different levels of education (undergraduate, postgraduate).

The strategic plan is based on four domains. In the education domain, the plan looks at the development of new programmes and at conferring an MP Pharm degree to graduates finishing a degree in pharmacy bringing the entry point to the profession at par with all other European countries. A new three year degree leading to a degree of Bachelor of Science in Pharmaceutical Technology is being proposed to prepare graduates that can support pharmacists both in professional practice and in the pharmaceutical industry. At the postgraduate level a Master of Science in Clinical Pharmacy offered in collaboration with the University of Chicago is being elaborated. This course will attract an increased number of international students to the Department of Pharmacy.

The courses and practical placements offered by the department are developed to ensure a smooth transition for the student from academia to working life. This requires a high degree of collaboration with stakeholders to establish co-operation that leads to student placements which is being considered as another domain that will be further consolidated. Such student placements provide access to real scenarios for all students at the department.

These collaborations are running also at a research level, an area that has been identified as another domain for the strategic plan. A research-rich environment that stimulates development of research skills and the advancement of science and practice in the area of pharmacy will be sustained. At present the department holds two research grants through the National Research and Innovation Programme. The project ‘Increasing yield in drug production’ is carried out in collaboration with a local pharmaceutical industry and the project ‘Computer simulation of drug efficacy’ merges information technology with drug design. The department also has a strong research portfolio in the area of pharmacy practice where research projects carried out had an impact at the international level in the area of quality care standards. Over 200 project results have been published in peer-reviewed journals and presented at international conferences. Projects in this area have an impact on the local needs. The projects include the preparation of a Formulary for Mount Carmel Hospital, a Formulary for Karin Grech Rehabilitation Hospital, a Quality System for Karin Grech Rehabilitation Hospital, the Maltese Medicines Handbook, the Maltese Directory of Pharmacists and an English-Maltese Dictionary of Medical and Pharmaceutical Terms. Two ongoing significant research projects which are being run jointly with the Department of Surgery are the determination of antibacterial drugs in peripheral tissues in patients with peripheral arterial disease and the quantification of pancreatic amylase in gastric juice in patients receiving proton pump inhibitors. Recently a Research Officer funded through the Faculty of Medicine and Surgery was appointed to continue work on these projects.

The fourth domain is student affairs. Student access to information and support provided by the staff and the Head of Department is targeted to foster a culture of inclusiveness and success. Facilitation of information exchange and communication and student contact will be enhanced.

This strategic plan is being proposed to achieve the department’s vision to nurture an environment that fosters collaborative relationships with healthcare practitioners, the pharmaceutical industry and partners in pharmacy education that result in the advancement of educational programmes, research and in an increased focus on student needs.

Professor Lilian M. Azzopardi

Head, Department of Pharmacy
Fifth Year Students
Project Abstract
Pharmaceutical Care

Patient Management in Colorectal Cancer
Ilona Pirotta

Palliative Care in Cancer Patients
Ryan Sacco

Pharmacist Intervention in the Management of Parkinson’s Disease
Akram Shueb

Pharmacist Intervention in Ear, Nose and Throat Disorders
Rebecca Ann Said

Point-of-Care Testing: Hypercholesterolaemia
Stephanie Cutajar
**Patient Management in Colorectal Cancer**

*Ilona Pirotta*

**Background:** Patients newly diagnosed with colorectal cancer are often misled by fictitious information about the after-effects of cancer treatment. Oncology pharmacists are in an optimal position to support patients and their families in understanding their treatment.

**Objectives:** To evaluate the impact of side-effects related to colorectal cancer chemotherapy and to assess patients’ knowledge and expectations from treatment.

**Design:** Newly diagnosed subjects (44) with colorectal cancer, receiving 5-FU, FOLFOX or FOLFIRI, were recruited between June 2009 and January 2010. One questionnaire was used pre-treatment and another was used after the 1st, 3rd and 6th cycle of chemotherapy. The questionnaires were adopted from a study carried out by Lanfranco.\(^1\) Data was analysed using PASW Statistics 17 using the Chi-Squared Test.

**Setting:** Oncology Department, Sir Paul Boffa Hospital

**Main Outcome Measures:** Evaluation of side-effects experienced and assessment of patients’ knowledge and expectations from treatment

**Results:** From the patients’ expectations, 11 patients did not mention any expected side-effects whilst the other patients reported diarrhoea (26) and nausea (9). The majority (31) of patients stated that they desired further information about chemotherapy drugs and side-effects. Regarding occurrence of side-effects, fatigue was the most frequently occurring side-effect (34), followed by sensory peripheral neuropathy (23). Patients relied mostly on their consultants (35) and general practitioners (20) for information about treatment and side-effects.

**Conclusion:** The results showed a distortion in patients’ expectations of side-effects compared to actual side-effects experienced and a desire for further knowledge on treatment. A patient information booklet entitled ‘Colorectal Cancer Treatment - Living through Chemotherapy’ was prepared to fulfill patients’ expectations for further information.

**Reference:**


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**Palliative Care in Cancer Patients**

*Ryan Sacco*

**Background:** Educating patients about their medications in palliative care could improve compliance to medications and patients’ quality of life (QOL).

**Objectives:** To evaluate pharmacist intervention in the provision of palliative care.

**Design:** Thirty two patients receiving palliative care were recruited and 3 home visits were carried out for each patient. In the first visit, before pharmacist intervention was carried out, QOL and compliance were evaluated using the McGill QOL\(^1\) questionnaire and the compliance questionnaire.\(^2\) QOL and compliance were re-evaluated after the pharmacist intervention in the following two visits.

**Setting:** Malta Hospice Movement

**Main Outcome Measures:** QOL and compliance to medications

**Results:** From the 32 patients recruited, 3 patients passed away, reducing the number of patients to 28. Out of the 28 patients, 16 were male and 12 were female. The number of patients who were fully compliant to medications increased from 11 patients in visit 1 to 16 patients in visit 2 and 20 patients in visit 3 (p=0.053). All scores for the 5 domains of the McGill QOL questionnaire improved after the visits, with a statistically significant improvement in physical symptoms (p=0.000) and physical well-being (p=0.000) domains.

**Conclusion:** Evaluation of the pharmacist intervention indicated a positive impact on compliance and QOL, highlighting the importance of the pharmacist intervention in the provision of palliative care within a hospice care setting.

**References:**


Pharmacist Intervention in the Management of Parkinson’s Disease

Akram Shueb

**Background:** The interplay of patient symptoms, carer burden and medication non-compliance, contribute to a demanding task in the management of therapy for Parkinson’s Disease (PD).

**Objectives:** To develop and implement a pharmacist intervention plan in the management of patients with PD.

**Design:** An intervention plan was carried out for thirty-five patients suffering from PD during the first visit, followed by an evaluation during the second visit held after a minimum of eight weeks. Intervention tools included a medication chart, two patient leaflets and a pharmacist-run discussion with patients and their caregivers. Outcomes were measured using a compliance questionnaire, the PDQ-39 Quality of Life (QOL) Questionnaire, and an intervention evaluation sheet. Data was analysed using PASW Statistics 17 and the Paired Samples T-Test, Pearson Correlation, Chi-Squared and One-Way ANOVA tests were carried out.

**Setting:** Movement Disorders Outpatient Clinic, Rehabilitation Hospital Karin Grech

**Main Outcome Measures:** Patient compliance with medication, quality of life, evaluation of pharmacist intervention

**Results:** At the second visit there was an improvement in patient compliance to therapy (p=0.000), in the QOL domains of Mobility (p=0.038), Activities of Daily Living (p=0.006) and Social Support (p=0.01). Fifteen patients were in favour of always having a pharmacist intervention.

**Conclusion:** The pharmacist intervention at an outpatient setting within a multidisciplinary team improved patients’ QOL and their adherence to therapy.

**References:**


Pharmacist Intervention in Ear, Nose and Throat Disorders

Rebecca Ann Said

**Background:** The variety of medications prescribed in Ear, Nose and Throat (ENT) disorders may result in patient misunderstanding of correct dosage regimen and inappropriate overuse of medications. The role of the pharmacist in this setting includes aiming for better medication management through patient communication and medication advice.

**Objective:** To evaluate the impact of pharmacist intervention on patient compliance to medication.

**Design:** Sixty patients were randomly selected according to specific inclusion and exclusion criteria, namely; new case male and female adult rhinitis patients who did not require surgical intervention. The Morisky Medication Adherence 8-item scale (MMAS-8) was administered to all patients. Subsequently, patients were randomly divided into Group A (control n=20), Group B (n=20) and Group C (n=20) respectively. A pharmacist intervention was offered to patients in Group B and C. An information leaflet on rhinitis was designed and distributed to patients in Group C only as part of the intervention. Patients were re-assessed after 12 weeks. Data collected from the questionnaire was analysed using the PASW Statistics 18.

**Setting:** ENT Outpatients Clinic, Mater Dei Hospital

**Main Outcome Measures:** Patient compliance to medication related to ENT disorders

**Results:** From the sixty patients interviewed, the majority (n=45) were female and the mean age was 36 years (range 20-70 years). There was no significant increase in patient compliance to medication for the patients in control group A (p>0.05). A statistically significant increase in compliance was seen for patients in intervention groups B and C (p<0.05).

**Conclusion:** Compliance to medications used in the treatment of rhinitis patients was poor and improved with the pharmacist intervention. This confirms that significant changes in medication adherence were observed following a pharmacist intervention.

**Reference:**

Point-of-Care Testing: Hypercholesterolaemia
Stephanie Cutajar

Background: Point-of-care testing is an activity relevant to chronic disease management. It gives the opportunity for monitoring of parameters during patients’ visits.

Objectives: To propose and evaluate interventions carried out by a pharmacist to monitor lipid profile and educate patients on lifestyle modifications in a community pharmacy setting.

Design: Forty-one patients, chosen by convenience sampling were monitored for blood lipid parameters during 3 visits over 8 months (at 4 month intervals). During each visit a questionnaire was completed, documenting medications taken and lifestyle habits. Results were analysed using PASW Statistics 17.

Setting: Community pharmacy, Haz-Zabbar

Main Outcome Measures: Pharmacist interventions, patient lifestyle habits and lipid profiles during initial visit and 2 subsequent visits

Results: The study has shown that the monitoring programme proposed to detect risks of hypercholesterolaemia can be conducted in a community pharmacy setting. Improvements in lifestyle and dietary parameters were detected between visits but were not statistically significant.

Conclusion: More than a year is needed for lifestyle changes to statistically affect lipid parameters. It is important to consider the attenuation of the impact of pharmacist advice throughout the three visits. This could be improved by applying a motivational approach to the intervention and highlight the intervention by providing patient leaflets and other information, for example, interactive demonstration of benefit obtained through visual demonstration using an online cardiovascular risk assessment tool such as QRISK 2.

References:

Pharmacotherapy

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Pain Relief after Caesarean Section
Luana Buhagiar

Background: The occurrence of pain should preferably be predicted to maintain the patient pain-free. Pain prediction could be the key to providing customised post-surgery analgesia.

Objective: To determine factors that predict pain and analgesic requirements following caesarean section.

Design: Females scheduled for caesarean section, who gave informed consent, were studied. Three tests were performed on the eve of the surgical procedure to determine each patient’s pain threshold and tolerance. Postoperatively, 75 patients [Group A] received IM pethidine (100mg every 6 hours), while 18 patients [Group B] were provided with morphine by IV-patient controlled analgesia (PCA). All received rectal diclofenac (100mg every 12h) and had paracetamol available on request. Pain intensity was assessed at regular time intervals using numerical rating scales. Statistical analysis was conducted using parametric tests and linear regression analysis in PASW Statistics 18.

Setting: Obstetrics and Gynaecology Department, Mater Dei Hospital

Main Outcome Measures: PainMatcher™ was used to evaluate electrical pain threshold while PainTest™ algometers (manual FPN 100 and digital FPX 25) determined pressure pain threshold and tolerance.

Results: Ninety-three women were enrolled. In Group A (IM pethidine), a negative relationship was observed between pain scores at 6 and 24 h, and electrical pain threshold (r=-0.25, p<0.02 and r=-0.23, p<0.03, respectively). The latter was also significantly correlated to the quantity of paracetamol that the patient consumed by the second postoperative day (r=-0.32, p<0.004). The consumption of paracetamol by patients in Group B (PCA morphine) was considerably higher (F=89.33, v₁=1, v₂=91, p=0.000). Pressure pain tolerance proved to be the best predictor of post-surgery morphine requirement (B=-0.13, p<0.02).

Conclusion: Simple sensory tests provide insight to postoperative outcome in women undergoing elective caesarean sections. The tests proposed may allow prediction of the level of postoperative pain and personal adjustment of treatment.

Prevalence, Characteristics and Management of Endometriosis
Lorraine Camilleri

Background: One of the major clinical problems associated with endometriosis is infertility.

Objectives: To determine the demographic, clinical and laparoscopic characteristics of infertile patients diagnosed with endometriosis and the outcome of the treatment administered.

Design: Four hundred and thirty seven patient files of women suffering from infertility with a link or no link to endometriosis were viewed after selection from the laparoscopy register at MDH. Data was collected from 74 patient files that met the inclusion criteria. Data was analysed using PASW Statistics 18.

Setting: Obstetrics and Gynaecology Department, Mater Dei Hospital (MDH)

Main Outcome Measures: Obstetric and gynaecological profile of infertile women diagnosed with endometriosis

Results: Endometriosis with infertility was diagnosed in 74 patients (16.9%) (average age 31±4 years). Infertility was primary in 54 patients and secondary in 17 patients. The type of infertility for 3 patients was not noted in the patient files. Endometriosis was minimal in 38 patients, moderate in 6 patients and severe in 4 patients. However, the classification of endometriosis was not available for 26 patients. When menstrual flow was moderate, endometriosis was minimal and when menstrual flow was heavy, endometriosis was severe (v₁ = 4, p = 0.007, χ² = 14.018). Endometriosis was encountered in the uterosacral ligaments and in the pouch of Douglas in 16 patients. Patients who achieved a pregnancy included: 16 patients that did not receive any treatment and 8 patients that were treated with goseregin.

Conclusion: The demographic details as well as the clinical and laparoscopic characteristics, such as, age of presentation, sites affected and symptoms experienced were similar to what has been reported in the literature.

Reference:
Urinary Tract Infections in Pregnancy
Nathalie Brincat

Background: Urinary Tract Infection (UTI) symptoms such as nocturia, frequency and urgency are habitually reported by pregnant women in the absence of a UTI. Several studies have shown that only 30-50% of women with clinical symptoms have infected urine.

Objective: To correlate the use of antibiotics for UTI in pregnancy to results from diagnostic tests, such as urine culture and urinalysis.

Design: For this observational retrospective study (August 2009 to April 2010), 49 pregnant patients diagnosed with UTI were included. A list of these patients was obtained from the hospital ward and relevant patient data files were retrieved from the Medical Records Department. A data collection sheet was used to collect data.

Setting: Obstetrics Ward 2, Mater Dei Hospital

Main Outcome Measures: Correlation between antibiotics and laboratory results using Microsoft Excel 2007

Results: In all 49 patients, signs and symptoms such as loin pain, dysuria, fever, positive unilateral renal punch or suprapubic tenderness were present. A positive urine culture coincided with UTI diagnosis in 10 patients. Eight negative urine culture results were obtained a day after antibiotic treatment was started. Twenty-eight patients with negative urine cultures also had positive nitrite, protein, white blood cell or red blood cell markers. Two patients had negative urine cultures and urinalysis results; in both cases, urine samples had been taken before start of antibiotic therapy and antibiotics were still administered due to abdominal tenderness and loin pain. In 4 patients, urine culture and urinalysis results were negative and antibiotics were not given; clinical signs present included nausea, increased frequency and abdominal pain.

Conclusions: Although a few cases of UTI are not identified by the diagnostic tests, some negative test results were obtained due to administration of an antibiotic prior to performing the test. Some UTI symptoms reported are due to pregnancy itself.

Reference:

Chronopharmacology in Hypertension
Deborah Cassar

Background: Chronotherapy is a new option to optimise blood pressure (BP) control, allowing individual treatment of hypertension according to the circadian BP profile of each patient.

Objectives: To test the effect of perindopril and valsartan on 24h BP profile and to compare the effects of morning and evening dosing on circadian BP.

Design: Patients had their 24h BP profiles measured using an ambulatory blood pressure monitor (ABPM) to evaluate the effects of morning and evening dosing of perindopril (10 patients) and valsartan (5 patients) on circadian BP. Patients (7) suffering from hypertension but taking no medication and normotensive patients (5) were recruited as controls. Statistical analysis was undertaken using SPSS version 16; the Mann-Whitney test was used.

Setting: Medical Out-Patients, Cardiac Laboratory at Mater Dei Hospital and community pharmacies

Main Outcome Measures: 24h BP profile results from ABPM device

Results: Compared to evening administration, morning administration of perindopril resulted in a significantly lower systolic blood pressure (SBP) only for the Day Time period (0800h-2000h) and Whole Day (p=0.03). For valsartan, SBP of Whole Day, Day Time, Early Morning (0600h-1000h) and Night Time (2000h-0800h) periods was significantly lower after morning administration (p=0.000, p=0.006, p=0.002, p=0.000 respectively) and Diastolic Blood Pressure (DBP) of Whole day and Night Time period was also significantly lower after morning administration (p=0.026, p=0.036).

Conclusion: Evening administered perindopril did not result in optimum 24h BP control, but morning administration led to higher BP values during the critical Early Morning period. Evening administration of valsartan led to peaks all throughout the 24h period even during the critical Early Morning period while morning administration produced a more controlled BP profile.

Reference:
Chronopharmacology in Diabetes  
*Michelle Antoinette Cole*

**Background:** Chronopharmacology has significant implications for drug delivery systems particularly in diabetes mellitus (DM).  

**Objectives:** To compare the occurrence and mean duration in hours of hypoglycaemia, hyperglycaemia and normoglycaemia between conventional insulin and insulin glargine and analysis by time of day for episodes of hypoglycaemia.  

**Design:** A total of 23 patients, aged over 18 years, suffering from type 1 DM participated in the study. Each patient used the continuous glucose monitoring system (CGMS) for 72 hours. Data collected was downloaded on the computer using a com-station device and analysed using the CGMS System Solution™.  

**Setting:** Diabetes and Endocrine Clinic, Mater Dei Hospital

**Main Outcome Measures:** Blood glucose levels, food consumed, exercise carried out and insulin administered during the 72-hour monitoring

**Results:** The mean number of peaks (>10 mmol/l) and troughs (<3.9 mmol/l) over 24 hours, that occurred with the insulin glargine was found to be similar to the number obtained when using conventional insulin.  

**Conclusion:** Diabetes is better controlled using insulin glargine but this has not been proven in this study. This requires further investigation since this study did not account for inter-patient variability.

**References:**


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Side-Effects of Methotrexate in Rheumatoid Arthritis  
*Krisha Cuschieri*

**Background:** A major limitation of methotrexate (MTX) use is the incidence of side-effects that may be experienced.  

**Objective:** To collect data on the incidence of MTX-related side-effects in the Maltese population and to investigate the knowledge of patients on the side-effects.  

**Design:** A questionnaire was administered twice to 40 patients, suffering from rheumatoid arthritis and taking methotrexate at an interval of 3 months. Responses were scored to test patient knowledge on their condition. Data was handled using PASW Statistics 17.  

**Setting:** Rheumatology Clinic, Mater Dei Hospital

**Main Outcome Measures:** Patient reporting of occurrence of side-effects before and after a list of possible side-effects had been read out to them

**Results:** Patient knowledge scores were tested for improvement after 3 months using the paired sample t-test. No significant increase in scores (p>0.05) was observed and a positive Pearson correlation of 0.399 was obtained. Average scores were 5.1 out of a possible total of 10. A statistically significant difference (p<0.05) was observed with patients’ responses before and after being read out a list of possible side-effects (n=25), with 64% of patients (n=16) claiming experiencing side-effects when they had originally thought they had not.  

**Conclusion:** If patients are educated on their condition both before and during treatment, patient knowledge will remain stable (Pearson correlation = 0.399). Patients lack knowledge about MTX side-effects (scoring on average 5.1/10) and many do not recognize side-effects when they experience them.

**Reference:**

Biological Agents in Rheumatoid Arthritis
Cynthia Said

Background: The evaluation of the impact of biological therapy in rheumatoid disease on quality of life (QOL) could be translated into increased productivity by the patient and carers and offset a considerable amount of the increased costs.¹

Objective: To evaluate the impact of biological agents on the QOL of rheumatoid patients (RA) patients.

Design: The study was divided in 3 phases. During phase 1 (t=0) prior to commencing biological therapy, patients were asked to complete the SF-36 and HAQ questionnaires. During the next 2 phases (t=3 and t=6 months respectively), the patients were asked to complete the questionnaires again. At t=3 and t=6, the patients were on biological therapy for 3 months and 6 months respectively. Data from the questionnaires was compiled and analysed using PASW Statistics 18. One-Way ANOVA and Post-Hoc Tukey tests were used.

Setting: Rheumatology Outpatient Clinic, Mater Dei Hospital

Main Outcome Measures: Evaluation of the impact of biological agents in improving the QOL of RA patients

Results: Thirteen patients were recruited: 11 patients were female and 2 were male with a mean age of 54 years and mean duration with RA of 11 years. The mean difficulty rating scores obtained for the HAQ between phase 1 and phase 2 were significantly lower (p<0.05) whilst those between phase 2 and 3 were not statistically significant (p>0.05). The mean scores for every SF-36 domain were significantly higher between phase 1 and 2 and between phase 1 and 3 (p>0.05).

Conclusion: QOL improved significantly three months after starting treatment indicating the immediate-onset of the benefits of therapy which could result in greater ability of the patient to lead an independent lifestyle and contribute to the workforce.

Reference:
1. Coleiro B. Cost-effectiveness of drugs which suppress the rheumatic disease process [MPhil dissertation]. Msida (Malta): Department of Pharmacy, University of Malta; 2009.

Protocols for Skin Conditions
Anna Maria Cassar

Background: In dermatology, the need to study and understand the relationship between adherence and treatment outcome is important. However, few studies have quantified adherence in dermatology.²

Objective: To introduce a clinical pharmacist intervention within a dermatology out-patient clinic.

Design: Initial patient review and prescription analysis was carried out, followed by the distribution of questionnaires assessing quality of life and compliance.²,³ Pharmacist counselling aimed at improving compliance and quality of life was applied, with a final questionnaire distributed to assess changes in compliance. Results were inputted in Microsoft Excel 2007 and analysed using Kappa testing, McNemar test of symmetry and Wilcoxon test.

Setting: Dermatology Department, Sir Paul Boffa Hospital

Main Outcome Measures: Evaluation of pharmacist intervention and its impact on compliance and quality of life in dermatology patients

Results: Twenty three patients were selected for pharmacist intervention: 16 were female and 7 were male. Fifteen patients suffered from leg ulcers, 3 patients had psoriasis, 1 patient had a fungal skin infection, 2 patients suffered from acne and 2 patients had eczema. Patients expressed the highest response rate in the range of 11-20 in the Dermatology Life Quality Index Scores (DLQI).

Conclusions: The study has indicated the feasibility of a clinical pharmacist intervention within the local setting.

References:
Quality Systems and Patient Safety

Validation Instruments for Community Pharmacy: An Update
Claire Anne Scicluna

Validation of Clinical Pharmacy Services
Maria Mamo

Patient Safety in the Intensive Therapy Unit
Lara Chetcuti
Validation Instruments for Community Pharmacy: An Update
Claire Anne Scicluna

**Background:** The ‘Validation of Community Pharmacy Method’ is a process intended to measure quantitatively the standards of professional services provided by community pharmacists and the impact of the intervention on patient care.\(^1\)

**Objectives:** To review and update the tools proposed in the ‘Validation of Community Pharmacy Method’ and to investigate the feasibility of elaborating the system electronically.

**Design:** An observation study and a literature review were carried out to identify areas in the tools which needed to be updated. Face and content validity of the updated tools was undertaken by a focus group. All the updated tools were tested for reliability by being applied in 5 community pharmacies. A website including the newly developed tools was created. An online evaluation sheet was developed and distributed to 20 pharmacists.

**Setting:** Community pharmacies

**Main Outcome Measures:** Psychometric evaluation of the updated tools and evaluation of the electronically elaborated tools

**Results:** The updated tools were valid and robust. Inter-observer reliability was justified for all the internal tools as the p-value exceeded the 0.05 level of significance (p>0.217). Cronbach Alpha values exceeded the 0.7 criterion (r>0.946) indicating satisfactory test-retest reliability for the Tools that featured an update. All pharmacists agreed that a computerised audit system would offer an advantage over paper-based systems.

**Conclusion:** Through research it became evident that since the original study was undertaken, the scope of community pharmacy has been substantially extended. Psychometric testing established the validity and reliability of the updated tools while the feasibility study demonstrated the willingness and interest of having a computerised audit system in the local community pharmacy setting.

**Reference:**


Validation of Clinical Pharmacy Services
Maria Mamo

**Background:** Practice standards are essential for effective implementation of pharmaceutical care and medicines management programmes. In Malta there are no nationally agreed standards for clinical pharmacy services. A Standard Operating Procedure (SOP) is a written specification which ensures good practice, assures the safety and consistency of a service, clarifies roles and is a useful training tool.\(^1\)

**Objectives:** To identify and quantify services provided by pharmacists in a rehabilitation hospital and to develop, validate, implement and evaluate SOPs for the clinical pharmacy services.

**Design:** A time and motion study was conducted using a validated data collection form. During an 18-day period, 6000 minutes of direct observation of the work patterns of 3 pharmacists on 3 wards and in the pharmacy were undertaken. Descriptive statistics were carried out. SOPs for clinical pharmacy services were developed, validated, tested for applicability and practicality, implemented and evaluated.

**Setting:** The Rehabilitation Hospital Karin Grech

**Main Outcome Measures:** Distribution of services carried out by pharmacists and SOP library

**Results:** Out of 6000 minutes of observation, 3636 minutes (60.6%) were dedicated to ‘Clinical’ services for which SOPs were developed, namely: ‘Patient Admission’, ‘Patient Profiling’, ‘Prescription Monitoring’, ‘Patient Discharge’, ‘Patient Medication Trolley Check’, ‘Emergency Trolley Check’ and ‘Controlled Drugs’. A ‘Master’ SOP and a ‘Training’ SOP were also developed. Evaluation after 1 and 4 months showed that the pharmacists found the SOPs useful, easy to follow and effective in the standardisation of clinical pharmacy services.

**Conclusion:** In this hospital, clinical pharmacy services are the main interventions undertaken by pharmacists. The SOPs developed for these services were relevant, practical and useful in this setting.

**Reference:**

Patient Safety in the Intensive Therapy Unit
Lara Chetcuti

Background: The complexity of processes and medical conditions make the Intensive Therapy Unit (ITU) prone to error thus making patient safety an issue that urgently needs to be addressed. Moreover “patient safety incidents commonly result where procedures are absent, incomplete or where staff do not follow written procedures due to lack of awareness, insufficient knowledge or because they do not agree with them and routinely violate them.”

Objectives: To identify drugs administered via intravenous infusion (IVI) associated with high risk of injury and to develop guidelines to decrease the possibility of medication errors associated with the use of these drugs.

Design: The first part of the study involved collection of data for each drug delivered via IVI. Summary of Product Characteristics (SPC) documents and Technical Leaflets of drug formulations were used. In the second part of the study, the layout of the guidelines was developed and a preliminary evaluation was carried out on a small population of the nurses in the ITU to elicit their opinions. The information from the SPCs was inputted onto the guideline template and validated by a team of health care professionals.

Setting: Intensive Therapy Unit, Mater Dei Hospital

Main Outcome Measures: Development of a set of quick reference guidelines

Results: The guidelines consist of 35 drugs administered via IVI. One page represents each drug and is divided into 7 sections with the following headings: Trade and generic name of drug, mode of dilution, mode of administration, properties, indications and safety issues. Results from the preliminary evaluation revealed the preferred format and general opinion of guidelines in terms of aesthetics.

Conclusion: The study prepared practical written guidelines and procedures to support knowledge and practices of staff so as to minimise patient safety incidents.

Reference:
Pharmacy Information

Maintaining a Formulary for Karin Grech Hospital
Stephanie Rapa

Health Promotion in the Community Pharmacy
Gillian Spiteri

Pharmacy Journal
Janet Sultana
Maintaining a Formulary for Karin Grech Hospital

*Stephanie Rapa*

**Background:** The rational and cost-effective use and safe and secure handling of medicines are two key components of medicines management. The goal of formularies is to promote rational, effective and safe prescribing of drugs.¹

**Objective:** To update, develop and publish a formulary for Karin Grech Hospital (KGH)

**Design:** Updating and development of the formulary was started following approval from the Hospital Research Committee. A list of medicinal products available on the local market and the Maltese Government Formulary List² were used to identify medicinal products to be included in the KGH formulary. Before development of the formulary, a questionnaire was distributed to 100 healthcare professionals to identify information which the healthcare professionals wanted to be included in the formulary. The formulary was compiled including the following details for each medicinal product: Trade name, active ingredient, dosage form, dosage regimen and strength and consumer price. The formulary was evaluated by 6 healthcare professionals and subsequently disseminated.

**Setting:** Karin Grech Hospital, a rehabilitation hospital.

**Main Outcome Measures:** Publication of the third edition of the KGH formulary and evaluation of its contents, use and costs

**Results:** Eighty healthcare professionals completed the questionnaire before compilation of the formulary where 72 healthcare professionals wanted the formulary layout to be similar to the British National Formulary. The developed formulary lists 860 medicinal products; 300 medicinal products in the previous formulary were updated, 55 were removed and 42 items were added.

**Conclusion:** Many changes were made, indicating that formulary updates should be undertaken more frequently.

**References:**


Health Promotion in the Community Pharmacy

*Gillian Spiteri*

**Background:** Health promotion aims to reach people before they are symptomatic and at a time when changing health behaviour can prevent illness, disability and premature death.

**Objectives:** To develop a newsletter for community pharmacies on relevant health promotion topics and to propose health promotion events to be undertaken in community pharmacies.

**Design:** Topics were identified for each of the seven issues of the newsletters to be published. The newsletters were developed in collaboration with the Health Promotion and Disease Prevention Directorate. The newsletters were distributed to all community pharmacies (208). A community pharmacy setting was chosen for the organisation of the health promotion events, where promotional material was displayed for patrons. Two questionnaires were developed and reliability testing carried out. Chi squared analysis was undertaken for the patron’s questionnaire and the One-Way ANOVA test for the pharmacist questionnaire.

**Setting:** Community pharmacies

**Main Outcome Measures:** Pharmacist evaluation of each issue of the newsletter and patrons’ feedback on health promotion events organised

**Results:** For all the seven newsletters, the mean rating score elicited for all questions was above 3 on a scale 1-5, indicating that the newsletters were positively rated by the pharmacists. Question 4 (‘The newsletter should be longer’) achieved a low rating score, below the mean rating score of 3. For the health promotion events, the patients were in favour with all statements, with the greatest score elicited (91.2%) for ‘Should the pharmacy set up an area in the pharmacy dedicated to health promotion?’

**Conclusion:** The pharmacists rated the newsletter which dealt with topics that could be used to disseminate health promotion in the pharmacy positively and patrons were in favour of the health promotion events prepared.
Pharmacy Journal
Janet Sultana

Background: Pharmacy journals as publications play various roles in the biomedical community. It is therefore relevant to be aware of current trends in pharmacy journals.¹

Objectives: To investigate the current trends in pharmacy journals and to identify markers of quality within a pharmacy journal.

Design: Journal titles were generated using EBSCO Host, ISI Web of Knowledge and PubMed Journal Database, which gave 10,582 results, filtered by exclusion criteria to 202 journal titles. General journal information was gathered from PubMed and other official sources. Information regarding journal performance was collected mainly through Journal Citation Reports. Information about pharmacy journal publication was compiled.

Setting: Virtual domain, Universities’ libraries

Main Outcome Measures: continued/discontinued, type and distribution of journal subject terms, media used for dissemination, author guideline availability, country of publication, type of publisher and journal accessibility, journal citation report

Results: Pharmacy parameters and descriptors of note were compiled and were analysed for trends. The process underlying journal publication was documented.

Conclusion: This is a time of change for journals, due to open access, electronic media, research from emerging markets, ailing subscriber budgets, cynicism about journal performance measures and higher aspirations towards quality.

Reference:

Pharmacy Administration and Pharmacoeconomics

Public Perception of the Pharmacist
Francesca Tabone

Implementation of the Pharmacy-Of-Your-Choice Scheme and Interprofessional Relations
Rosanne Mahoney

Medication Administration System at the Rehabilitation Hospital Karin Grech: An Observational Analysis
Stefan Meli

History of the International Pharmaceutical Federation
Lynn Marie Mifsud

Pharmaceutical Statistics: Malta, Where Does it Stand?
James Cini

Pharmaceutical Policy and Access to Medications
Amanda Pace

Pharmacoeconomic Analysis of Generic Drug Use
Federica Spiteri Maempel

Waste Management in Pharmacy
Karen Attard
Public Perception of the Pharmacist  
Francesca Tabone

Background: Pharmacists’ professional roles have evolved throughout the years, with these changes resulting in a focus on collaborative pharmacist-patient professional relationships.¹

Objective: To determine the perception of the Maltese general public on the community pharmacist and the current pharmacy service, to determine community pharmacist perception of pharmacist prescribing and to present suggestions for discussion by the respective authorities for the potential implementation of pharmacist prescribing in Malta.

Design: Psychometrically evaluated, locally developed self-administered community pharmacist and general public questionnaires adapted from Wirth² were distributed to 50 community pharmacists and to 500 consumers respectively. Descriptive statistics were undertaken using PASW Statistics 17.

Setting: Community pharmacies

Main Outcome Measures: Perception of the Maltese public regarding pharmacist-led professional services and pharmacist perception on supplementary prescribing

Results: A response rate of 100% (n=500) was obtained for the general public questionnaire and a 90% (n=45) response rate was obtained for the community pharmacist questionnaire. Consumers were in favour of the evolvement of pharmacist professional services, including the provision of diagnostic testing (90%) and collaboration with physicians (87%). Eighty-two percent (n=37) of pharmacists were in favour of the local implementation of supplementary pharmacist prescribing.

Conclusion: Maltese consumers have a positive overall perception of the community pharmacist and of the services offered from community pharmacies. The majority of pharmacists were willing to participate in supplementary prescribing.

References:


Implementation of the Pharmacy-Of-Your-Choice Scheme and Interprofessional Relations  
Rosanne Mahoney

Background: The Pharmacy Of Your Choice (POYC) scheme was implemented as a pilot project in December 2007. The scheme allows patients to collect their chronic medication supplied free of charge from a pharmacy of their choice.

Objective: Assessment of pharmacist perception of the scheme and evaluation of the impact of the POYC on physician-pharmacist relations.

Design: A questionnaire was distributed twice to 46 pharmacists who manage medication supplied through this scheme. Another questionnaire was distributed to 90 physicians, practicing in private and public sectors, identified using stratified sampling. Observational case studies were carried out on a weekly basis for 132 hours, to follow physician-pharmacist relations in a community pharmacy.

Setting: Local community pharmacy

Main Outcome Measures: Pharmacist perception at Time 0 and after 1 year, perception of physician impact on interprofessional relationship with pharmacists, handling of drug-related problems (DRPs) and interprofessional relationship.

Results: After a year, the majority of pharmacists feel indifferent (n=11) or agree (n=11) that the improved POYC scheme is more efficient than the previous one. Sixty-three (70%) physicians returned the questionnaire and those practising privately (n=25) stated that they contact pharmacists more often than before, whilst the majority of physicians practising in health centres agree (n=6) that the POYC scheme helped strengthen interprofessional relations. During the observation study, from a total of 620 POYC cases, 26 required an interprofessional intervention due to DRPs.

Conclusion: The POYC scheme improved the interprofessional relationship between pharmacists and physicians. A number of DRPs identified by the pharmacist during dispensing of POYC prescriptions required an interprofessional intervention.
Medication Administration System at the Rehabilitation Hospital Karin Grech: An Observational Analysis
Stefan Meli

**Background:** Medication administration errors (MAEs) are significant contributors to the morbidity and mortality of hospitalised patients. Observation studies are an effective and accurate way of detecting MAEs and examining their nature.

**Objectives:** To measure the incidence and nature of MAEs and to analyse contributing factors.

**Design:** A prospective direct-observation study was set up and tested by means of a 2-week pilot study. A panel of 3 pharmacists and 3 nurses validated the observation sheet. The main study involved observing nurses during treatment administration for a period of 3 months. Each ward was visited 12 times; 3 times for each treatment session chosen to be observed (08:00, 12:00, 14:00 and 20:00) giving a total of 60 observation sessions. Discrepancies between what was observed and what was prescribed on the treatment chart were noted as MAEs.

**Setting:** The Rehabilitation Hospital Karin Grech

**Main Outcome Measures:** Medication administration errors detected during the direct observation study

**Results:** Out of 1213 observed administrations, 440 had at least one error (36.3%). The most common errors were leaving the drug next to the patient instead of administering it (25.8% of errors, n=147) and not giving the drug at the exact time (± 45 mins) (17.4%, n=99).

**Conclusion:** Direct observation is a powerful tool in medication error research which could lead to the amelioration of medication administration systems. MAEs are common and mostly minor in nature. This finding is comparable to other studies in this field.

**References:**


History of the International Pharmaceutical Federation
Lynn Marie Mifsud

**Background:** The idea of establishing an international federation of pharmacy first came about at the 10th International Congress of Pharmacy held in Brussels in 1910. The International Pharmaceutical Federation (FIP) is a worldwide federation of National Pharmaceutical associations. It represents and serves more than a million pharmacists world-wide.

**Objective:** To compile a publication which summarises FIP’s foundation in 1912, its on goings and commitments to the profession across time.

**Design:** The study was divided into 3 phases. Phase 1 involved an extensive literature review which was carried out in Malta to gather information about the history of FIP and its congresses. International associations relating to pharmacy were also contacted for help. Phase 2 involved visiting the archives at the FIP headquarters in The Hague. Over 150 publications of FIP dating from 1912-2010 were reviewed and copies of any relevant material found in the journals were made. In phase 3, the information collected was summarised and included in a publication titled ‘Founding the International Pharmaceutical Federation’.

**Setting:** University of Malta; FIP headquarters, The Hague, The Netherlands

**Main Outcome Measures:** Extracts from the journals ‘Bulletin de la Federation Internationale Pharmaceutique’, ‘Journal Mondial de Pharmacie’, ‘Bulletin d’Informations’, ‘Pharmacy International’ and ‘International Pharmacy Journal’ dating from 1912 to 2010 related to FIP activities; conclusions and policy statements issued from time to time and their impact on pharmacy practice and science

**Results:** A publication has been collated to include a narration of FIP’s history in chronological order. It includes a detailed account of the early years and a summary of the decades thereafter of FIP activities.

**Conclusion:** This study of aspects of the performance of FIP should serve to stimulate future achievements.

**Reference:**

Pharmaceutical Statistics: Malta, Where Does it Stand?  
James Cini

**Background:** Pharmacy is an integral part of a country’s healthcare system and involves a number of human and financial resources. Statistics are considered essential. Comparison of statistical data between countries can provide knowledge of the areas concerned by highlighting existing differences.

**Objectives:** To determine the statistics related to pharmacy which are compiled in Malta, to identify the sources of these statistics and to compare local statistics with those of foreign countries.

**Design:** The study was carried out in 4 steps. The sources of reliable pharmaceutical statistics were identified. Data related to pharmacists, pharmaceuticals and illicit substances was collected from the sources identified. The statistics were compiled and presented as graphs using Microsoft Excel 2003. The local statistics compiled were compared to other countries.

**Setting:** National and international pharmacy information

**Main Outcome Measures:** List of sources of pharmaceutical statistics from Malta and 30 other countries; collection, compilation and comparison of local and foreign pharmaceutical statistics

**Results:** A total of 62 local statistics were compared to foreign sources regarding pharmacists (8), pharmaceuticals (30) and other substances (24). These statistics revealed that Malta has a high number of pharmacists, a high consumption of prescribed antibiotics and anti-diabetic agents and a high use of illicit inhalants among adolescents. Compared to other countries, deaths due to smoking in Malta are low.

**Conclusion:** Malta compiles similar statistics to those found in most European countries. Differences were found between countries, especially between EU and non-EU countries. The statistics collected showed that local and foreign results are very similar and that Malta is up to standard with other developed countries.

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Pharmaceutical Policy and Access to Medications  
Amanda Pace

**Background:** Pharmaceutical policies are an inter-related network of areas such as the selection of essential drugs and affordability and policy objectives according to the World Health Organisation framework.¹

**Objectives:** To review and present key constituents of pharmaceutical policy and their impact on the level of access to medicinal products on the local market.

**Design:** Four Descriptive Logic Models were compiled for 2001, 2006, 2009 (retrospectively) and 2010 (prospectively) to portray access (affordability and accessibility) as the main public health outcome in relation to areas from pharmaceutical policy. Triangulation of literature review, documents and media research and interviews was done. Logic Models were longitudinally assessed to note trends in access (rational use and quality).

**Setting:** Local National Health Service

**Main Outcome Measures:** Qualitative data on the level of access and related problems encountered within the pharmaceutical field

**Results:** In model 1 (2001) registration of medicinal products required a Certificate of Pharmaceutical Product. Model 2 (2006) showed a sharp decrease in availability of medicinal products and a new registration system requiring European Authorisation. In model 3 (2009) the supply of medicinal products through the national health scheme changed with the introduction of the Pharmacy Of Your Choice Scheme and reference pricing was considered for inclusion of items on the Government Formulary. Model 4 (2010) displayed pricing reductions.

**Conclusion:** Pharmaceutical policy has been changing over the past 10 years and this has primarily affected systems by which products are made available on the market.

**Reference:**

Pharmaceutical Analysis of Generic Drug Use
Federica Spiteri Maempel

**Background:** The issue of pricing of medicinal products in Malta is an ongoing debate.

**Objectives:** To investigate the current situation on the local availability of generic drugs and their prices.

**Design:** Local retail prices of generic drugs and their originator counterparts were compiled. A price comparison was carried out using original and the new prices resulting from a government-led process for lower medicine prices. Regression analysis was performed to observe differences in price. The One-Way ANOVA test was used to investigate which drug class presented the largest difference in price between comparator drugs.

**Setting:** Three local community pharmacies

**Main Outcome Measures:** Drug prices for originator and generic products

**Results:** The difference between the mean prices of the comparator drugs prior to price reductions was found to be €0.74/Defined Daily Dose (DDD). This difference was found to decrease to €0.58/DDD with the introduction of new prices. Only 3.4% of generic drugs were found to decrease in price, with the cardiovascular drugs recording the largest difference. With respect to originator drugs, 23.7% registered a price reduction, with anti-infective drugs reporting the highest difference. For every euro paid for a generic drug, €1.70 was being paid on average for an originator drug. This value was found to decrease to €1.47 with the introduction of reduced prices.

**Conclusion:** Prices of generic drugs are indeed less expensive than their originator counterparts. The reduction of reduced prices for a number of medicines changed the price ratio for Malta. There is the need to increase generic entry onto the Maltese market so as to reduce the overall cost of medicines.

Waste Management in Pharmacy
Karen Attard

**Background:** Efforts for Malta to conform to European standards have been taking place, however, improvements in the field of pharmaceutical waste management are lacking.

**Objective:** To identify pharmaceutical waste management practices in all pharmaceutical sectors.

**Design:** Questionnaires were used to analyse practices in pharmacies and in households. These were analysed using the chi squared test with PASW Statistics 17. Unstructured face-to-face interviews were used for pharmaceutical industries and hospitals.

**Setting:** Pharmacies, local pharmaceutical industries, hospitals, companies dealing with pharmaceutical waste, households

**Main Outcome Measures:** Perception of consumers and pharmacists on pharmaceutical waste management

**Results:** Households: 65.2% discard unwanted medicines in the garbage, 20% flush it down the toilet, 10.5% return it to the pharmacy and 4.3% discard it down the drain of the sink.

Community pharmacies: 6% of patients frequently return unwanted medicines, 26% occasionally do so when relatives die, 54% return unwanted medicines rarely and 14% never do. The pharmaceutical industry: The Marsa incinerator does not reach 1100°C thus waste has to be exported. Hospitals: A top-up system has recently been implemented to minimise waste production in wards. Expired drugs are stored in medical stores until they are incinerated.

**Conclusions:** A large incinerator which reaches 1100°C is required for incineration of pharmaceutical waste from all sectors. An official pharmaceutical waste management plan is also needed for households and pharmacies as copious amounts of medicines are being discarded nonchalantly causing damage to the environment, which does not conform to EU standards.

**Reference:**

Industrial Pharmacy and Regulatory Affairs

Methods to Improve Yield in the Production of Slow Release Oral Dosage Forms
Nicolette Bartolo

Stability Study of Drugs in Transport
Helga Farrugia

EU GMP: Inspection of Suppliers
Rowena Marie Agius

Standard Operating Procedures in Pharmacy
Jessica Briffa

Setting Up a Pharmacovigilance System for Medical Oxygen
Samantha Camilleri

Identification of Impurities in Medical Oxygen
Amy Smith

Impurities in Ethanol 96%
Katrina Gatt

The Content of Sulfur Dioxide in Wine
Ghislaine Calleja
Methods to Improve Yield in the Production of Slow Release Oral Dosage Forms
Nicolette Bartolo

Background: Research and Development plays an important role in the pharmaceutical industry to enhance Good Manufacturing Practice by improving manufacturing processes and making them more economically viable.

Objective: To target the critical parameters which have an impact on the yield in the production of slow release oral dosage forms and suggest any changes which could be implemented to improve the yield.

Design: The production of slow release venlafaxine-hydrochloride pellets was studied to identify the parameters which affect the yield during the application of venlafaxine-hydrochloride onto the sugar spheres (Part A) and the subsequent application of the slow release coating onto the pellets (Part B). A sample was taken from each batch to determine the surface roughness of the pellets produced. A total of 30 batches were monitored and data from the Batch Manufacturing and Instructions Record was collated from each batch. Statistical analysis was performed using PASW Statistics 17.

Setting: Starpharma, Industrial Estate, Hal Far

Main Outcome Measures: Parameters affecting the yield in the production of slow release venlafaxine-hydrochloride

Results: In Part A, the temperature of the product was affected by the temperature of the air entering the coating pan (p = 0.004) and the velocity of the pump with which the solution is sprayed (p = 0.000). The extraction waste and selection waste account for 43.6% of the variation in the yield of active pharmaceutical ingredient. In Part B, a statistically significant correlation was found between the dissolution of the pellets and the surface roughness (p = 0.022) on applying the second slow release coating.

Conclusion: The parameters which have an impact on the yield were the temperature of air entering inside the coating pan, the velocity of the pump, extraction waste, selection waste and the surface roughness.

Stability Study of Drugs in Transport
Helga Farrugia

Background: Ten percent of all medicinal products are cold chain products requiring storage and transportation temperatures to be in the range of 2 and 8°C.1 During transportation of these pharmaceutical products it is essential to maintain an unbroken cold chain to ensure drug quality, safety and efficacy.

Objectives: To determine the risk of temperature fluctuations on the quality of fluvastatin active pharmaceutical ingredient (API) during international transport.

Design: Fluvastatin API in amber glass vials was shipped to 6 different countries together with Humistick® data loggers during different seasons in 2008/09 and 2009/10. Samples and data loggers were returned to Malta via courier. A validated HPLC method was used to analyse the increase in percentage impurity of 5-oxofluvastatin. A stability study was carried out over a period of 4 months from which an Arrhenius plot was drafted.

Setting: Analytical department at Actavis Malta; shipping destinations were France, Italy, Germany, The Netherlands, Denmark and England

Main Outcome Measures: Increase in 5-oxofluvastatin using HPLC and calculation of the mean kinetic temperature (MKT) from the hourly temperature loggings during transport

Results: Throughout the export process calculated mean kinetic temperatures were above the recommended storage conditions for fluvastatin API (2-8°C), ranging from 16°C (winter 2008/2009) to 29°C (Summer 2009/2010). The stability study indicated that fluvastatin API degrades considerably at temperatures above 40°C.

Conclusion: An increase in temperature leads to an increase in degradation of the temperature sensitive products. Provided that MKT values do not exceed 30°C, fluvastatin API can still be used if there are minor malfunctions in the cooling system. Temperature logging is an important parameter used to indicate possible degradation.

Reference:
EU GMP: Inspection of Suppliers
Rowena Marie Agius

Background: Good Manufacturing Practice (GMP) deals with incorporating quality rather than testing quality to ensure that manufacturing is implemented without risks towards the final quality.1

Objective: To design a pre-audit questionnaire for pre-qualification of printed packaging material from suppliers, to estimate the level of good practice and to flag areas which need to be further investigated during on-site audits.

Design: The questionnaire was devised using reference books, field studies, discussions with two experts, interviews with qualified persons (QP) and investigations of finished product-quality problems caused by these suppliers. It was discussed with five experts (President of QP Association, QP, Director of Inspectorate at the Medicines Authority, personnel in regulatory affairs and academia and printing packaging material quality manager). The questionnaire should target essential aspects of GMP and specific characteristics of the manufacture of printed packaging material.

Setting: Printed packaging material site

Main Outcome Measures: Likert scale measurement of suitability of questionnaire

Results: The questionnaire consisted of 85 questions (66 closed ended, 10 multiple choice, 9 open ended). The questionnaire was divided into: Part A (section 1) and Part B (sections 2 to 12). Part A consisted of questions targeted to elicit background information. The structure of Part B was based on the EU GMP and PS9000:2001 guidelines which examined the quality system, documentation, environmental controls, validation, customer specifications, incoming materials, electronic system security, pre-press controls, production, quality controls and distribution. The questionnaire included a foreword and a glossary explaining 19 key words. The response to the questionnaire design by 6 out of 7 suppliers was positive (3-4 out of 1-4 scale).

Conclusion: The developed questionnaire which can be adopted in the inspection process by pharmaceutical industry outsourcing printing suppliers can help to diminish baseline work that is necessary to cover this process and contribute towards standardisation of the process.

Reference:
1. Arayne MS, Sultana N, Zaman MK. Historical incidents leading to the evolution of good manufacturing practice. Accred Qual Assur. 2008; 13(8); 431-432.

Standard Operating Procedures in Pharmacy
Jessica Briffa

Background: Standard Operating Procedures (SOPs) are documents that outline procedures in a clear and concise manner. The application of SOPs in the pharmaceutical sector promotes quality and efficacy. In 2005, written SOPs were introduced in clinical and community pharmacy practice in the UK, covering dispensing and other activities.

Objective: To develop SOP templates for different areas of pharmacy

Design: Examples of SOPs from different pharmaceutical areas were examined and interviews were held with pharmacists to determine the design of the SOPs. Interviews were held with a hospital pharmacist, with a distributor and with a pharmacist with community practice experience in the UK to analyse the SOPs implemented in each sector. Five templates were designed. One of the templates represents the master SOP describing how SOPs are designed. The other four templates are specific to each of the specific pharmaceutical areas: Community, clinical, distribution and industry.

Setting: Hospital pharmacy, medicinal products distributor and community pharmacies

Main Outcome Measures: Compilation and validation of SOP templates

Results: Five SOP templates to illustrate the general SOP structure in different pharmaceutical sectors were developed. The titles of these SOP templates are: Standard Operating Procedure, Clinical Standard Operating Procedure, Community Standard Operating Procedure, Distributor Standard Operating Procedure and Industrial Standard Operating Procedure.

Conclusion: The developed SOPs will ensure a successful quality system in the workplace whether it is distribution, dispensing or manufacturing. Such a system enhances safety and efficacy in pharmacy practice.

Reference:
Setting Up a Pharmacovigilance System for Medical Oxygen

Samantha Camilleri

Background: As of July 2008, Poligas Ltd. became legally obliged to follow Pharmacovigilance (PV) regulations.¹

Objective: To set up a PV system for medical oxygen.

Design: The PV system was divided into: Part 1 involved writing the Standard Operating Procedures (SOPs) and registration with EudraVigilance and in Part 2 a training program was devised. The study focused on Part 1. Local and foreign guidelines were used to identify the requirements to establish the system. The SOPs were based on the current version of the Master SOP at Poligas to conform with the company’s Quality Management System. EMEA’s website provided guidance on the registration process which could only be carried out after the Qualified Person responsible for PV (QPPV) completed a training course held by the Drug Information Association in London. A 24 hour reporting service, technical agreements between the company and QPPV, and a method for global adverse drug reaction (ADR) searches were devised. A series of meetings with the Chief Executive Officer and Responsible Person at Poligas were held and a meeting at the Medicines Authority was attended.

Setting: Poligas Ltd., Malta

Main Outcome Measures: Developing and implementing the SOPs required for the PV of Poligas Ltd. and completion of Phase I registration with EudraVigilance.

Results: Nineteen SOPs and 15 appendices resulted. An email address for the reporting of ADRs was created, 2 technical agreements and a method for the collection of global ADR searches were devised. A series of meetings with the Chief Executive Officer and Responsible Person at Poligas were held and a meeting at the Medicines Authority was attended. A Periodic Safety Update Report was submitted on behalf of Poligas Ltd. Phase I of registration with EudraVigilance was completed and all necessary documents for registration were collected.

Conclusion: On completion of both Phase II and III of registration and training, the PV system may be considered ready for inspection by the Medicines Authority, scheduled for the second quarter of 2011.

Reference:


Identification of Impurities in Medical Oxygen

Amy Smith

Background: In the context of a sound quality control system, samples of medical oxygen are withdrawn for analysis at each production stage. A product quality review is carried out to highlight trends and assess the need for product improvement.

Objectives: To evaluate trends in the level of impurities in medical oxygen (O₂) and to identify variables affecting any such trends

Design: Samples from batches of medical oxygen cylinders were analysed for the presence of impurities specified in the European Pharmacopoeia.¹ The sample consisted of one cylinder chosen at random from a batch of cylinders. Data was collected for 1800 samples. Data for variables, such as batch and O₂ purity, which may affect the level of impurities, was also collected. A data sheet was created using Microsoft Excel 2007. Data was analysed using PASW Statistics 19. Regression analysis and One-Way ANOVA were carried out.

Setting: Poligas Ltd.

Main Outcome Measures: Quantitative analysis of impurities

Results: The mean impurities differ significantly between the categories of batches and season (p< 0.05). In summer, the mean impurity was 7.46ppm for H₂O, 5.85ppm for CO₂ and 1.61ppm for CO. In spring, the mean impurity was 2.52ppm for H₂O, 2.65ppm for CO₂ and 0.43ppm for CO. The predictor oxygen purity also contributed significantly to the variation in responses (p< 0.05).

Conclusion: All impurities fell within the specified limits.¹ Each impurity was present in higher levels in summer and autumn, with winter and spring having the lowest occurrence of all 3 impurities. This indicates that atmospheric conditions play a role in impurity content of the cylinders. Other factors also play a role since the impurities also varied with respect to O₂ purity.

Reference:

Impurities in Ethanol 96%
Katrina Gatt

Background: Impurities are extraneous compounds that form during synthesis, extraction, purification or storage of a pharmaceutical product. Such impurities include degradation products. Ethanol is produced either by fermentation or synthetically and the impurities it is likely to contain depend on the source.

Objective: To attain an understanding of the degradation behaviour of ethanol at storage conditions.

Design: Ethanol samples from two different manufacturers were stored at different conditions and run through Gas Chromatography-Mass Spectrometry (GC-MS). Results obtained were compared to a control to understand how the quality and quantity of impurities in ethanol changed over the course of a 10-week period at different temperatures.

Setting: Malta National Laboratory, San Gwann

Main Outcome Measures: GC-MS analysis for ethanol

Results: The chromatograms for the control samples and the samples stored under simulated conditions were very closely related in terms of interpretations.

Conclusion: The results obtained suggest that ethanol is stable as a molecule, irrespective of storage temperature. If other degradation impurities were present, they must have been at levels which are not detectible by the method used. Quantitative reports are used to deduce whether the levels of impurity which occur under a given set of storage conditions lie beyond the recommended levels.

References:

The Content of Sulfur Dioxide in Wine
Ghislaine Calleja

Background: Sulfur dioxide (SO₂) is a universal wine additive exhibiting effective antimicrobial, antioxidant and sensory properties. Free and total SO₂ must be analysed frequently for optimal preservation, however raised concentrations may trigger allergic reactions in some end consumers.

Objectives: To give an overview of the reliable determination of sulfites in wine, to determine the feasibility of introducing novel quantitative methods locally and to review safe organic alternatives to SO₂.

Design: The process involved in the submission of a research grant application was initiated and a comparative cost-efficiency study was devised for 6 different methods to quantify SO₂ content in wine. The iodometric titration was implemented to assay SO₂ in wine samples (n=82) and a sample comparative analysis using the aspiration/oxidation method was executed on a sub-population (n=22). A thorough review of data generated from foreign research collaborators involved in the development of sulfite-free organic additives was carried out.

Setting: Malta National Laboratory and Camilleri Wines Ltd.

Main Outcome Measures: Preservative action of commercially analysed wine and SO₂ content

Results: The application for funding successfully gained entry to the final shortlist. Experimental results confirmed that all wines are within regulatory limits. Both analytical methods generated similar results, however the iodometric titration was less specific and accurate.

Conclusion: The feasibility study demonstrates that the restricted volume throughput characteristics of the Maltese market do not support the introduction of novel technologies. Current winemaking approaches and research trends aim to critically reduce or eliminate the presence of sulfites in wine.

Reference:
Clinical Analysis and Drug Design

Distribution of Anti-Infective Agents to the Peripheries
*Lara Fiorentino*

Investigating the Angiotensin Converting Enzyme Inhibiting Properties of Naturally Occurring Terpenes Using *in silico* Models
*Sarah J Mifsud*
Distribution of Anti-Infective Agents to the Peripheries
Lara Fiorentino

Background: Treatment of peripheral ulceration and gangrene involves surgical intervention and antibacterial therapy.

Objectives: To analyse the distribution of gentamicin in skeletal muscle and subcutaneous tissue in patients receiving a 120mg or 240mg dose, who underwent amputation or debridement procedures.

Design: The method of tissue analysis developed was based on a method by Brown et al. A 600mg tissue sample was chemically homogenised by adding 1.2mL 2M NaOH. This was incubated at 70ºC for 20 minutes, cooled and the pH adjusted to 7.5±0.2 by adding 20% acetic acid. Density and volume were calculated. Analysis was undertaken using the Abbott TDxFLx analyser. Ethics approval and patients’ written consent were obtained. PASW Statistics 17 was used for data analysis.

Setting: Research Laboratories, Faculty of Medicine and Surgery, University of Malta; Toxicology Department, Mater Dei Hospital

Main Outcome Measures: Assessment of gentamicin concentrations in serum, skeletal muscle and subcutaneous tissue

Results: The mean percentage recovery for skeletal muscle and subcutaneous tissue methods were 89.8% and 99.9% respectively. The concentration of gentamicin in skeletal muscle tissue was 1.246µg/g higher than in subcutaneous tissue with a coefficient of determination of 0.956. The two significant predictors for both skeletal muscle and subcutaneous tissue concentrations are serum concentration and dose of gentamicin. Other relevant predictors for skeletal muscle tissue concentration were severity of peripheral arterial disease (PAD), age and gender.

Conclusion: Gentamicin is distributed to a higher extent in skeletal muscle than in subcutaneous tissue. The amount of gentamicin that reaches the tissue can be predicted through serum concentration and dose of gentamicin. For skeletal muscle tissue concentration severity of PAD, age and gender should also be considered.

Reference:

Investigating the Angiotensin Converting Enzyme Inhibiting Properties of Naturally Occurring Terpenes Using in silico Models
Sarah J Mifsud

Background: According to in-vitro hypothesis, the triterpene extract of Crataegus monogyna exhibits Angiotensin Converting Enzyme (ACE) inhibiting properties.

Objective: To understand the in silico binding modality of the triterpenes oleanolic acid (OA), ursolic acid (UA) and β-amyrin for the ACE ligand binding pocket (ACE_LBP), to establish their binding affinity for the ACE and to propose novel lead molecules based on the triterpene scaffold.

Design: The X-ray crystallographic deposition 1UZF describing the bound coordinates of captopril with the ACE was used. Bioactive conformation of captopril was extracted. The structures of the triterpenes were constructed. The Ligand Binding Affinity (LBA) of each was calculated. The best binding pose of each within the ACE_LBP was resolved.

Setting: Pharmacy Department, University of Malta

Main Outcome Measures: Symyx®- drawing 2D structures, Sybyl®- modeling, XSCORE- LBA calculation, LigBulider®- LBP elucidation, VMD- displaying and animating molecules

Results: The LBA of captopril for the ACE (pKd 5.36) was used as a baseline against which the affinities of the triterpene molecules could be compared. Since the chemical structures of captopril and the triterpenes were significantly different, binding modality and 3D volume occupied by captopril within the ACE_LBP were used to predict the best possible binding conformations (n=21 for each triterpene) of each within the ACE_LBP. The best binding conformation for each (pKd 7.04 (OA), 7.84 (UA), 7.25 (β-amyrin) was identified for further study.

Conclusion: The initial in vitro hypothesis was validated. Further structural optimisation of these molecules could identify novel ACE inhibiting structures.

Reference:
Master of Science (Pharmacy) 
Project Descriptions

The Maltese Public’s Perception of Generic Pharmaceuticals
Yvette Azzopardi

Use of NSAIDs and Patient Safety
Doris Baldacchino

Reference Pricing for Pharmaceuticals: A Policy Perspective
Tanya Formosa

Standard Operating Procedures for Quality Control in the Pharmaceutical Industry
Enas Mansor

Standard Operating Procedures In Pharmaceutical Regulatory Area
Simon Serge

The Financial Impact of the Pharmacy of Your Choice Scheme on Community Pharmacies
Gillian Soler
The Maltese Public’s Perception of Generic Pharmaceuticals

Yvette Azzopardi
The aim of the study was to evaluate the perception the Maltese population has of generic pharmaceuticals. To achieve this aim, two questionnaires were formulated and distributed to a sample of the public and community pharmacists with a response of 544 valid responses from the public and 69 from the pharmacists. It resulted that 49% of respondents from the public’s questionnaire know what the term “generic medicines” means and 51% don’t know. Knowledge was obtained: 27% got to know what generic medicines are through the questionnaire, 24% through the media and 27% through their healthcare professionals.

Use of NSAIDs and Patient Safety

Doris Baldacchino
The study involved assessing pattern of usage of non-steroidal anti-inflammatory drugs (NSAIDs) in a community pharmacy setting. A questionnaire was designed and distributed to 261 subjects in 13 pharmacies. Data was analysed statistically using Biomedical Data Package. Results showed a high prevalence of NSAID use (50% per district). The first NSAID of choice was diclofenac (36.4%), 42% of patients self-prescribed the drug. Risks of adverse drug reactions were recognized in 30-50% of patients. Various drug interactions were identified. A protocol for proper administration was proposed.

Reference Pricing for Pharmaceuticals: A Policy Perspective

Tanya Formosa
A study carried out on 18 interviewees associated with pharmaceutical pricing policies showed that there are 2 different reference pricing systems in operation – for the private and public sector. Two respondents considered the system successful in reducing prices of medicines in Malta; 6 considered it unsuccessful and 7 thought it had limited success. Reference pricing cannot be taken out of context of an integrated pharmaceutical system. Short, medium and long term measures should be taken by stakeholders involved – government, importers and consumers and systems constructed in accordance with Malta’s particular requirements.

Standard Operating Procedures for Quality Control in the Pharmaceutical Industry

Enas Mansor
Standard Operating Procedures (SOPs) are detailed written pieces of documented information set up to help employees achieve uniformity of the performance of a specific function. The aim of the study was to set up SOPs and highlight the importance of them. Nine SOPs have been prepared to be utilised at Aurobindo Pharma. Ltd. SOPs are a vital component of a successful operation. It is essential to operate safely and effectively with a comprehensive set of management systems and policies to ensure that goals and tasks at hand are understood by all parties involved.

Standard Operating Procedures In Pharmaceutical Regulatory Area

Simon Serge
A manufacturer’s (or importer’s) Quality Management System (QMS) incorporates a number of Standard Operating Procedures (SOPs) that apply Good Manufacturing Practice (GMP) requirements to the organisation. Introductory texts to SOP Management, Preparing an SOP and GMP are presented, together with a number of model SOPs. The texts are written in uncomplicated language and highlight salient points. The model SOPs cover topics of relevance to quality assurance and operations. They may be used as starting templates in developing or remodelling a QMS for a pharmaceutical organization.

The Financial Impact of the Pharmacy of Your Choice Scheme on Community Pharmacies

Gillian Soler
The project aimed to identify and quantify the activities pertaining to the Pharmacy-Of-Your-Choice (POYC) scheme. The time spent on the POYC scheme by pharmacists in three chosen pharmacies was quantified by direct observation using a time and motion study for a period of six working days in each pharmacy. In the study, 598 patients were involved and the total time that was attributed to the scheme in the three pharmacies was 48.3 hours. The reimbursement by the Government needs to be questioned to see if it is adequate.
Fourth Year Students
Project Descriptions
Point-of-Care Testing: Faecal Occult Blood

Adrian Agius

A review of the availability of faecal occult blood was carried out. Subsequently 3 kits were identified to be used in the study: Fecal Occult BLOOD PLUS® (LTA), hemo FEC® (Roche) and Clearview FOB® (Inverness Medical). A pilot study including participants from 9 pharmacies around Malta is being undertaken to evaluate cost, reliability and user-friendliness of the kits. Questionnaires are being used as assessment tools to evaluate the opinion of participants and pharmacists on the feasibility of carrying out the test in the primary care setting.

Care Issues in a Heart Failure Clinic

Marie Claire Aquilina

The pharmacist’s participation in identifying care issues at the Heart Failure Clinic at Mater Dei Hospital is being investigated. A questionnaire was compiled to evaluate quality of life, pharmacological management and patient compliance. Patients are being given an individualised treatment chart including relevant advice and are being followed up after 6 weeks when they are reassessed using the same questionnaire. Fifteen patients participated in this study with a mean age of 63 years. The overall quality of life improved significantly (p<0.05) within 6 weeks from the first visit.

Pharmacist Intervention in the Use of Diuretics in Elderly Patients

Sean Ryan Atkins

The study evaluates clinical pharmacist interventions in diuretic therapy by consulting the medical records of elderly patients who had suffered from past episodes of congestive heart failure. Patient records for the control group (St. Vincent de Paul Residence) and intervention group (Rehabilitation Hospital Karin Grech) are being reviewed to assess diuretic dose management and monitoring for renal function and serological investigations. Following a pilot study (n=10), the patient profile was improved to increase practicality for data collection.

Protocols in Dental Conditions

Daniela Attard

Three treatment protocols on recurrent aphthous ulcers, xerostomia and dental abscess were developed to be used as guidelines by community pharmacists when dispensing related treatment. The protocols and three case studies, one on each condition, were validated by a panel of experts consisting of pharmacists, dentists and doctors. The validated treatment protocols were compiled in a booklet. The booklet, along with the case studies will be distributed to all community pharmacies to establish compliance to the protocols.

Pharmacy Practice Resource Unit

Jaclyn Azzopardi

The Pharmacy Practice Resource Unit (PPRU) is a pharmacy simulation present in the Pharmacy Department at the University of Malta created to assist pharmacy students during their practice. A questionnaire was distributed to pharmacy students to analyse their perception of the PPRU including its purpose and the information resources available. Results showed that the majority of students only visit the PPRU during Pharmacy Practice tutorials. A system to familiarise students with the PPRU and to improve its accessibility will be developed to ensure that students benefit from this educational site.

Development of Diabetes Outcome Indices

Sarah Baldacchino

Indices that carry predictors which could affect outcomes of management of diabetes are being proposed. A cross-sectional study (n=92) was carried out at the Diabetes Clinic at Mater Dei Hospital to record data for 45 predictors included in the indices. A grade indicating the risk of Type 2 diabetes complication progression is assigned to participants according to the Diabetes Complication Progression Risk Scale devised after deliberation with an Expert Panel. Correlation and regression analysis using SPSS version 17 will result in the assignment of weightings to the predictors. Simplified indices are subsequently obtained using the backward elimination variable selection method (p < 0.05).

Adverse Drug Reactions Database

Stephanie Bezzina

An inventory of over 783 adverse drug reactions (ADRs) is being compiled, 133 of which are classified as psychiatric disorders, 304 are nervous system disorders, 209 are eye related disorders, 32 are ear related and 105 are musculoskeletal and connective tissue disorders. The active ingredients which are documented within the Summary of Product Characteristics to have caused these ADRs are listed accordingly. The MedDRA SOC classification, terms and frequency convention is being used. A database written in MySQL will contain this data, which will later be uploaded onto a website written in PHP.
Human Papillomavirus Screening and Vaccination

Angie Marie Brincat

Two self-administered questionnaires about the human papillomavirus were reviewed and psychometrically evaluated. One questionnaire was distributed to pharmacists and general practitioners practising in 30 community pharmacies chosen by stratified random sampling and to doctors working at the Obstetrics and Gynaecology Ward at Mater Dei Hospital including consultants, specialists and trainees. The other questionnaire was distributed to young females and other patients visiting gynaecology clinics. These two questionnaires are being used to assess knowledge on the human papillomavirus. To date 73 pharmacists, 38 general practitioners, 13 gynaecologists and 387 females completed the questionnaires.

Management of Urinary Tract Infections in Pregnant Women by Community Pharmacists

Katya Busuttil

A locally developed protocol on the management by community pharmacists of urinary tract infections during pregnancy was updated using evidence-based information and validated by experts. The validated protocol is being used to prepare a shorter, user-friendly protocol that will be disseminated with a validated questionnaire in all community pharmacies around Malta. Feedback regarding the usefulness of this protocol will be gathered and a concise protocol handbook will be distributed. The protocol will serve as a quick reference guide when consultation for this condition is required in a community pharmacy.

Quality Improvements in Good Distribution Practice

Suzanne Buttigieg

Analysis of the guidelines for Good Distribution Practice (GDP) was undertaken. Three wholesale dealers were visited and activities performed were observed. Improvements to the Quality Manual and Standard Operating Procedure templates compiled previously are being suggested. Training which is specific to the duties of the personnel working at the wholesaler is being given. Visual aids are being used and assessments are being carried out. Temperature mapping of the stores of another wholesaler was undertaken in December 2010 and August 2011 over a period of 5 days.

Devices Used For Dispensing

Deborah Cachia

Local availability of different dispensing devices was studied. Three devices were chosen for the study: weekly multi-dose pill box, the pill splitter and the electronic pill box reminder. Fifty patients were chosen from a community pharmacy by convenience sampling and interviewed regarding the practicality and cost effectiveness of the multi-dose pill box and the pill splitter. The electronic pill box reminder is being given to ten patients, who after using it for one week are rating the use of the device.

A Register for Biologicals in Rheumatology

Florinda Camilleri

The use of biological therapies within the rheumatology field has revolutionised treatment paradigms. Biological registers have become an important up-to-date source of evidence based medicine and a form of post marketing pharmacovigilance for the pharmaceutical industry and health care professionals. A framework for the setting up of a local biological register which is applicable to Malta has been designed based on insight of other European registers.

Oral Anti-Cancer Treatment

Stephen Camilleri

A list of all the oral anti-cancer drugs available in Malta was compiled and is being updated. A questionnaire was sent to 46 healthcare professionals working at the Oncology Unit at Mater Dei Hospital to find out about safety practices used when handling such drugs. The questionnaire was completed by 36 health care professionals. Twenty-eight would like to have a clinical pharmacist at the oncology unit. A questionnaire will be given to 50 patients to determine their views on oral chemotherapy. The pharmacist’s input in the education of patients will be established.

Dissemination of Protocols: Gastro-Intestinal Disorders

Marija Carmen Carbonaro

Protocols established in a previous local study for the management and treatment of upper gastro-intestinal disorders were reviewed and modified. Two new protocols were developed, one for NSAID-associated gastro-intestinal complications and another for H. pylori infections. A validation panel consisting of 3 pharmacists, 2 general practitioners and a medical specialist was set up to evaluate the protocols. These protocols will be implemented in 10 community pharmacies in Malta to assess their practicality and pharmacist compliance and will be disseminated in a booklet and through a website to all community pharmacies.
An Evaluation of the Oestrogen Receptor Modulating Abilities of the Extract of Padina pavonica Using in silico Techniques

Maria Cassar

The aim of this prospective study is to evaluate the modulating abilities of the Oestrogen Receptor (ER) when bound to Maltanedienol, a molecule obtained from an extract of indigenous seaweed Padina pavonica. Maltanedienol was drawn and optimised into SYBYL, and its binding affinity to the ER was measured using the PDB template 1A52. The X-SCORE algorithm obtained showed similar binding affinity of Maltanedienol as compared to the endogenous ligand 17-β oestradiol. Further comparative binding modality, affinity and pharmacophore studies with Selective Oestrogen Receptor Modulators (SERMs) will be performed.

Drug Design at the Peroxisome Proliferator-Activated Receptor

Julienne Ciantar

The ADOPT trial has shown that Peroxisome Proliferator-Activated Receptor γ (PPARγ) agonists, effective in the management of diabetes mellitus, are associated with an increased incidence of fractures. Through a de novo drug design approach, two different bound conformations of the PPARγ receptor were investigated. The ligand binding affinity (LBA) of rosiglitazone and farglitazar for their respective conformations of the PPARγ was estimated. Swapping ligands showed a decrease in LBA at both receptors. Pharmacophores for the two apo-conformations of the PPARγ have been generated by mapping the ligand binding pockets.

Storage of Medicines and Medical Devices

Daphne Coleiro

Maximum storage temperatures were compiled for drugs listed in the Medicines Authority list – Revision 48 – 06/2010, from the summary of product characteristics and patient information leaflet of the respective drugs. Out of 2130 drugs listed, 737 can be stored above 25°C, while 998 should be stored below 25°C. Maximal temperatures and duration were compiled for 71 drugs stored between 2 and 8°C and 2 drugs stored below -15°C. Storage conditions for 322 drugs were not available and 95 manufacturing companies were contacted. A printed booklet will be made available to pharmacists for reference purposes to promote proper storage.

Nutrition in Diabetic Patients

Ramona Cini

Questionnaires were distributed to 100 restaurant owners. Eighty-nine restaurants cater for people who request specialised menus and 18 out of these offer specialised menus for diabetic people. This shows a 17% increase when compared to a previous local study. Questionnaires will be distributed to 75 diabetic patients to evaluate their perception on nutrition in diabetes. Specialised recipes for diabetic patients were compiled in a booklet and will be evaluated by diabetic patients and community pharmacists.

Aeromonas-Associated Gastroenteritis in the Maltese Population: Diagnosis, Epidemiology and Treatment

Lisa Cuschieri

Stool samples submitted to the microbiology laboratory at Mater Dei Hospital are being tested for the enteric pathogen Aeromonas. Positive samples undergo antibiotic sensitivity testing and the clinician is informed of the results. The study is divided into 2 testing periods; 3 months during summer and 3 months in winter. The prevalence in summer was 1.22%. Identified strains were sensitive to many antibiotics. Testing during the winter months is currently being effected. When all data is collected, any antibiotic resistance patterns will be identified. Statistical analysis will determine if screening should be done routinely.

GMP in the Partial Manufacturing of Pharmaceuticals

Aaron Demanuele

Twenty-two standard operating procedure templates for partial manufacturing of pharmaceuticals are prepared. These templates should assist distributors who require a manufacturing licence to start performing secondary repackaging including exchange of leaflets and re-labelling before distribution to adhere to Good Manufacturing Practice. The templates are submitted to an expert review panel of 5 professionals for validation.

Creation of Two- and Three- Dimensional Molecular Databases for Cardiovascular Drugs

Luke Doublet Meagher

The aim of this project is to create a two/three-dimensional database using cardiovascular drugs as case studies. A list was created using Microsoft Excel that included chemical details and two-dimensional structures of each drug, which were drawn using SYMYX. Their interactions with receptors of interest were illustrated with the use of VMD, which yielded pictures of drug-receptor complexes. The data produced will be included in a structured database and its utility will be tested in the context of a pilot study carried out among undergraduate pharmacy students.
Evaluation of a Novel Series of Semi-Synthetically Designed ACE Inhibiting Molecules

Deborah – Louise Farrugia

An in silico study has confirmed a hypothesis that the terpenoid extract of Crataegus monogyna, more commonly known as the Hawthorne plant, has Angiotensin Converting Enzyme (ACE) inhibitory properties. Comparative Molecular Dynamic studies using the captopril/terpene:ACE complexes are being carried out in order to further validate this hypothesis. The Protein Data Bank deposition which is being used in this study is 1UZF and Molecular Dynamics is being performed using the AMBER software suite.

Women’s Health

Daniela Fenech

Four separate questionnaires have been formulated to test women’s knowledge on eating disorders, breast cancer, pregnancy and osteoporosis respectively. Draft copies of the questionnaires were evaluated by health care professionals and lay persons to ensure content and face validity. Test-retest reliability testing was undertaken after the questionnaires were amended. Information on the conditions is compiled and will be presented electronically. The questionnaires will be used to evaluate the knowledge before and after visiting the website.

Bar Coding in Pharmacy

Colette Galea

An extensive literature review was carried out to identify the applications of bar codes in a pharmaceutical setting, focusing mainly on community and hospital pharmacies. Pharmacies are currently being contacted and questionnaires are being distributed to those community pharmacies using a bar code system. The questionnaires will evaluate the usefulness of a bar code system and identify problems encountered and possible solutions when using such a system. A similar study regarding bar code use in local hospitals will also be carried out.

Intellectual Property and Pharmacy

Lara Giudice

An examination of the legislation which effects intellectual property and its influence on the pharmaceutical industry is being implemented. This will include a study about patentability as well as provisions by which the industry must abide. An extensive literature review was carried out. The use of intellectual property in the local scenario is being investigated by collaborating with the local Medicines Authority. A survey will be done to examine the local pharmaceutical industry’s stand on intellectual property, mainly that of patenting in Malta.

Androgen Receptor Binding Modalities and Prostate Cancer

Alexandra Grima

The X-ray Crystallographic model of metribolone bound to the androgen receptor (1E3G) was identified from the protein data bank. The steroid scaffold of the in-silico constructed abiraterone molecule was manually superimposed onto the template metribolone structure using SYBYL, in order for abiraterone to occupy the same bound coordinates as metribolone. Abiraterone was then docked into the active site of the androgen receptor in order to compare the binding affinity of abiraterone and metribolone using SCORE. The behaviour of abiraterone and metribolone will also be compared using a molecular dynamic study.

Dissemination of Protocols: The Common Cold

Lawrence Mayo

A protocol handbook on the management of common cold that was developed in a previous local study will be evaluated using a questionnaire. The aims of the questionnaire are to evaluate the handbook as a dissemination method and to study the feasibility of an online version of the protocols in the form of a website that was developed as an alternative method of dissemination. Psychometric testing for validity and reliability of the questionnaire was carried out.

Blood Pressure Control in Maltese Dialysis Patients

Anne Marie Mercieca

This prospective study evaluates adequacy of blood pressure (BP) control. During the first phase, 72 dialysis patients were recruited. Their quality of life (QoL) and compliance to antihypertensive medications were evaluated using validated questionnaires and consecutive BP readings were taken. Factors affecting patients’ BP, QoL and compliance were assessed and an intervention was carried out. The second phase of the study is currently being carried out after 6 months, where consecutive BP readings are being taken and the same patients re-interviewed. A group of 50 non-dialysis patients is being interviewed as a control group.
**Newsletter for Community Pharmacy**

*Caroline Mercieca*

‘Keeping Abreast’ is a bimonthly newsletter issued on behalf of a local pharmaceutical company, Actavis Malta for community pharmacists in Malta and Gozo. It presents contemporary topics, articles and patient advice on treatment of conditions and medications with emphasis on the local scenario. A questionnaire is distributed to pharmacists to evaluate each issue. To-date, the majority of the respondents agree that the articles are informative, interesting, well written, of adequate length, the layout is professional and attractive and the font is suitable.

**Design of Family Ligands for the HIV-1 Protease Enzyme**

*Chantelle Micallef*

HIV-1 protease (HIV-PR) is a fundamental component in the production of infectious virions making it an ideal target for the design of molecules, with the ability to inhibit the functional processes of the HIV-PR. A drug design study is being carried out, in which several PDB depositions in complex with HIV-PR have been selected. Simplification of such PDB depositions has been carried out using SYBYL®, followed by estimating quantitatively the Ligand Binding Affinity using X-Score in order to initiate the molecular design.

**The Creation of Two and Three-Dimensional Molecular Databases for Drugs Acting on the Central Nervous System**

*Michael Miller*

An index of two-dimensional structures of drugs acting on the central nervous system was compiled using SYMYX Draw®. The focus will now be shifted to the creation of their respective three-dimensional structures using SYBYL® software package and where available, the PDB files of the ligand bound to its active site have been rendered using VMD, illustrating the mode in which the two bind together forming the ligand-protein complex. Once completed, the structures will be presented to a student cohort in an attempt to establish their use as valid educational tools.

**Dissemination of Protocols: Paediatrics**

*Martina Muscat*

Six previously locally developed protocols for the treatment of paediatric ailments were reviewed and modified. A booklet was compiled and validated by a panel of experts. A pilot study was conducted to evaluate the applicability and practicality of the booklet and its long-term use. The booklet is currently being disseminated to all managing pharmacists and students, together with access to an electronic version of the protocols and an evaluation questionnaire. Pre and post-knowledge tests were developed to assess the use of the protocols as training tools for students.

**Good Laboratory Practice**

*Corinne Muscat Terribile*

Evaluation questionnaires were distributed (n=120) to evaluate 3 High Level Standard Operating Procedures (SOPs) implemented in the laboratories of the Pharmacy Department. These SOPs were reviewed and implemented. The same questionnaire is being distributed to re-evaluate the new version of these SOPs. In addition, 31 equipment SOPs were developed, tested and implemented and 31 laboratory logbooks were issued to keep track of equipment usage within the laboratories. A general evaluation questionnaire will be distributed to pharmacy students and laboratory demonstrators to evaluate the implemented quality system.

**Pharmaceutical Services in Lifestyle Modifications: Overweight and Obesity Management**

*Vanessa Petroni*

The effectiveness and patients‘ opinion of a community pharmacy-based weight management program through completion of pre/post-intervention questionnaires and patient monitoring is evaluated. Pharmacies and patients were selected for intervention and control groups. Educational material (leaflets, handouts and a handbook concerning weight management) in English and Maltese language were prepared. A pilot study and expert panel subjected the educational material and questionnaires to validation, applicability, practicality and test re-test reliability processes. Both groups are being monitored at five-weekly intervals, with, only the intervention group being provided with educational advice.

**Compendium of Medicines used in Veterinary Practice**

*Bernard Soler*

A database, which is the basis of the Veterinary Medicines Compendium, was designed using Microsoft Access. Data collection is currently being undertaken and information gathered is being reviewed and sorted into the following categories: Generic name, trade name(s), indications, dosage form(s), dosage regimen(s), side-effects, mode of action, local supplier. Information collected relates to veterinary medicines licensed for use in Malta and all information has been approved by the Ministry for Resources and Rural Affairs, and/or European Medicines Agency. The compendium will be evaluated by veterinarians and pharmacists using a questionnaire.
Herbal Medicine Formulary

Maria Spiteri

The first volume of the formulary entitled ‘Herbal Monographs including Herbal Medicinal Products and Food Supplements’ was compiled and published. It includes 120 monographs for herbs having their common names starting with letters ‘A’ to ‘O’ and 424 products which contain herbal ingredients. Validation of the monographs is currently being undertaken by laymen and healthcare professionals. A complete formulary will be printed and disseminated in all pharmacies.

Protocols in Eye Conditions

Bianca Maria Stivala

Protocols directed to pharmacists when presented with external segment conditions, conjunctivitis and dry eye disease and case studies based on the protocols have been designed and are currently being validated by a panel of experts. The protocols will be distributed to community pharmacies together with the case studies to assess pharmacist compliance to the protocols.

Point-of-Care Testing in Gynaecological Disorders

Anne Marie Zammit

The diagnostic kit Clearview® Chlamydia was selected for this study to assess practicality of point-of-care testing for chlamydia infections. The study will be carried out at the Genito-Urinary Clinic at Sir Paul Boffa Hospital. The first 40 women presenting at the clinic which fit the study criteria will be eligible to participate. The patients will have two cervical specimens collected. One of the samples will be tested by PCR test, whilst the other will be tested with the kit. The reliability, practicality and cost-effectiveness of the diagnostic kit will be evaluated.

Quality of Medical Devices

Kimberly Zammit

Hundred patients scheduled for venous blood sampling at the Diabetes and Endocrine Clinic at Mater Dei Hospital were recruited for capillary testing with two automated blood glucose meters. Blood glucose values obtained by the Bionime® Rightest™ GM550 and the AccuChek® Go vary by a maximum of 1-2mmol/l. Another hundred patients were recruited from a community pharmacy for point-of-care testing with a mercury sphygmomanometer, an aneroid sphygmomanometer and an automated blood pressure monitor. Statistical tests are applied for both the blood glucose and blood pressure study for comparison and correlation.

A Mini-Scale Production Facility

Ruth Zerafa

The requirements for setting up an oral solid dosage mini-scale production facility in Malta are being identified. These are designed to meet Good Manufacturing Practice and be accredited to European Union standards since the facility could also be used to produce batches for clinical trials. The main production area layout, based on the flow of material and personnel, is designed and validated. The percentage of delivered-equipment cost method will be used to determine the initial capital investment required.
Third Year Students
Project Descriptions
Quality Management System for the Non-Clinical Pharmacy Services at Rehabilitation Hospital Karin Grech

John Agius

Non-clinical pharmacy activities at Rehabilitation Hospital Karin Grech were identified through observation studies of current practices. Standard operating procedures for these non-clinical activities will be developed, validated by pharmacy staff, tested for applicability and practicality and implemented.

Auditing of Standard Operating Procedures for Clinical Pharmacy Services at Rehabilitation Hospital Karin Grech

Jonathan Agius

Standard operating procedures (SOPs) for clinical pharmacy services which are implemented at Rehabilitation Hospital Karin Grech will be audited. An audit tool for each SOP will be created. The audit will be undertaken by following the audit cycle. The audit techniques that will be used are observation, interview and documentation.

Post-Operative Analgesia Management in Patients Undergoing Heart Surgery

Danika Agius Decelis

Patients will be randomly divided into a control and experimental group. The experimental group will be given advice on pain control using verbal information, graphical representation and a dosage regimen table, including a diary. Patients will be asked to complete a pain score chart once weekly. The patients will be re-interviewed 6 weeks after surgery to assess compliance.

Point-of-Care Testing in Helicobacter pylori

Daniel Attard

Point-of-care tests detecting the presence of Helicobacter pylori were identified and two serological tests were chosen for the study. An evaluation will be carried out to determine practicality, feasibility and patient acceptance in a community setting. The tests will be offered from 10 community pharmacies selected by stratified random sampling.

Pharmacovigilance

Elise Axiak

The project involves setting up a pharmacovigilance system in a medical oxygen-producing company. An aspect of this setup involves training of personnel. This is achieved by supplying information about the importance and principles of good pharmacovigilance and by implementing relevant standard operating procedures. Competence of personnel will be evaluated by completion of an assessment.

English-Maltese Dictionary of Medical and Pharmaceutical Terms

Ruth Bonnici

The English-Maltese dictionary of medical and pharmaceutical terms covers letters ‘A’ to ‘K’ written by Eliza Camilleri (2007) and Miran Spiteri (2010). Words starting with letter ‘L’ listed in ‘Mosby’s Medical, Nursing and Allied Health Dictionary’ are currently being translated and referred to a linguist for validation. Letters ‘M’ to ‘P’ will be translated following the same method.

Creation of a Two and Three-Dimensional Molecular Database of Drugs Used to Target the Endocrine System

Denise Borg

Efficient information retrieval is vital in the context of a scientific community whose research output depends on easy access to data. A two/three-dimensional database of drug structures used to treat endocrine disorders is being compiled and where relevant, a drug-receptor complex image will be created. An evaluation of their educational role will be performed using a selected student cohort.

Prescribing of Analgesics in Community Pharmacy

Christina Cachia

A questionnaire will be administered to adolescents (14 to 18 years) regarding the use and self-administration of non-prescription analgesics for different types of pain. The outcome of this study will determine whether adolescents require further education on the use of pain medication and to propose prescribing systems for community pharmacists responding to scenarios for pain management in this specific age group.
Creation of a Two and Three-Dimensional Molecular Database of Drugs Used in Malignant Disease and Immunosuppression

Ryan Camilleri

This project uses computational graphics including cue depth imaging and lighting effects to depict two and three dimensional images of drug molecules and their receptors. A searchable two/three-dimensional database of molecules and their receptors is being constructed. Cytotoxic drugs, drugs affecting the immune system, sex hormones and hormone antagonists used in malignant disease will be considered.

Comparative Costs of Cardiovascular Drugs

Mark Cardona

The cost of all cardiovascular drugs available from community pharmacies was compiled. A cost comparison will be carried out using SPSS Statistics. The cost of cardiovascular drugs in the United Kingdom will be obtained to compare the cost of cardiovascular drugs between the two countries.

Drug Administration Systems in Elderly Patients

Angela Cassar

To compare drug administration systems in two elderly institutions by analysing medication error rates. An observation method is being used in which the observer identifies medication errors occurring in different wards. The medication error rates will be calculated as the frequency of medication errors during the observation period divided by the total opportunities for errors.

Creation of a Two and Three-Dimensional Molecular Database for Drugs Used to Target the Respiratory System

Sara Jo Cassar

An understanding of the intricacies of torsion and conformation of complex molecules found in contemporary therapeutic armamentaria will be attained through the construction of two/three-dimensional molecular structural databases using specific software packages. This will highlight key drug interactions which occur at the endogenous cognate receptors. The perceived impact of the molecules will be assessed.

Formulary for Non-BNF Cited Items

Daniel Corso

The ‘Maltese Medicine Handbook’ last published by Cassar (2009) is being updated. This handbook contains a list of medicines and medical devices which are not found in the British National Formulary. A list of medicines published by the Medicines Authority is being used to identify medicines to be included in the handbook. A new edition will be issued and evaluated.

Access to Pharmacy Services

Simon Corrieri

Pharmacy services in Malta require improvement. A study on the feasibility and need for different community pharmacy services including a consumer helpline is being carried out. The study consists of gathering data from various pressure groups. The feedback obtained will influence the recommendations put forward.

Metabolic Syndrome and Patient Management

Leanne Cutajar

Two hundred individuals are being recruited to participate in one of three groups: diabetics with and without metabolic syndrome and non-diabetics with metabolic syndrome. For each group, biological markers are compared and 50 individuals are invited to participate in lifestyle intervention reinforcement for one year. Weight, waist circumference, blood pressure and blood tests are assessed at baseline, after six months and one year.
Pharmacy Projects 2011

Creation of a Two and Three-Dimensional Molecular Database of Drugs Used in Obstetric, Gynaecological and Urinary Tract Disorders

Mariana Ellul

Methodologies that help render abstract concepts more tangible are recognised as being invaluable tools in teaching. Using Symyx® software, two-dimensional structures for drugs used in gynaecology, obstetrics and urinary disorders were generated. Their chemical and structural properties were then assembled into a database using Microsoft Excel. Interactions with receptors of interest will be highlighted.

Preparing a Course for Pharmacist Prescribing

Andrew Fenech

A locally proposed course for pharmacist prescribing is being updated and evaluated. The perception of pharmacists and pharmacy students will be investigated. An online version of the course will be made available via an online journal. The improvement in knowledge before and after using the course material will be tested.

Design of Novel HMG-CoA Reductase Inhibitors

Denise Formosa

Using an in silico approach, a tool to predict in vitro binding affinity for a series of known ligands for the 3-hydroxy-3-methyl-glutaryl-CoA reductase enzyme was sought. In silico binding affinity was estimated for a series of ligands and correlated with in vitro data. Results indicate a linear relationship between in vitro and in silico data.

Gastric Amylase Activity and Use of Proton Pump Inhibitors

Charlene Galea

Different proton pump inhibitors (PPIs) (omeprazole, esomeprazole, rabeprazole, lansoprazole and pantoprazole) may affect salivary and pancreatic α-amylase activity to different degrees. Samples of gastric juices will be collected from patients on PPIs undergoing gastroscopy. The Reflotron® device will be used to quantify amylase activity. Results will be pooled with those from previous studies and correlated with drug and medical history.

Investigating the Anti-Oestrogenic Effects of Ephedrine

Kathryn Galea

This is an in silico project that seeks to validate or refuse the hypothesis that ephedrine possesses anti-oestrogenic effects. Molecular modelling and structure based drug design techniques will be used as the tools in this study.

Pharmacist Recommended Non-Prescription Medicines

Sephora Galea

A list of non-prescription medicines, available locally, was compiled and will be updated. A questionnaire will be developed for distribution to all pharmacists in Malta and Gozo. The questionnaire will assess the factors that determine the recommendation of a particular non-prescription medication over another.

Chronic Renal Failure and Bone Density

Daniela Ghio

Thirty postmenopausal women aged 40-50 years suffering from Chronic Renal Failure (CRF) are recruited to undergo bone density tests. Bone density test results obtained from a control group of 30 volunteers will be used to compare and evaluate osteoporosis prevalence in patients with CRF. Patient monitoring, management and treatment for bone density disease will be established.

INR Testing and Anticoagulation Drug Therapy Monitoring

Elena Marie Mifsud

A pilot study will be performed to investigate the feasibility and efficacy of pharmacist-led INR monitoring and of recommending warfarin dose adjustment for patients who collect warfarin through the Pharmacy-of-Your-Choice (POYC) Scheme. Fifty patients who use the POYC scheme will be recruited. INR will be monitored using the CoaguChek’XS device and the anticoagulant dose modification proposed according to an algorithm.
Penetration of Clindamycin in the Peripheries

Martina Mifsud

An extensive literature review has been carried out to identify methods of analysis of clindamycin. Clindamycin is used in patients with infected foot ulcers. To date, a method of analysis of clindamycin in plasma has been identified and will be used to develop a method to quantify clindamycin in peripheral tissues.

Development of Computational Chemistry Practicals

Noel Pace

This project seeks to evaluate the impact of introducing medicinal chemistry and drug design practical sessions to a selected student cohort. Pre- and post- practical session questionnaires were designed. These have been piloted during the first phase and the required amendments will be made during the second phase of the study.

Investigating the Anti-Oestrogenic Effects of Synephrine

Christina Pace Bardon

This project seeks to investigate the hypothesised anti-oestrogenic activity of synephrine, one of the major components of citrus aurantium, which is a major component of dietary supplements. *In silico* techniques will be used to accept or refuse this hypothesis.

Drug Design at the Peroxisome Proliferator Activated Receptor

Stephanie Portelli

To construct a predictive tool for estimating the ligand binding affinity (LBA) of small molecules for the Peroxisome Proliferator Activated Receptor (PPAR). Using receptor based modelling techniques, preliminary estimates of the LBA of rosiglitazone, farglitazar and the experimental agonist INT131 for PPAR were performed. This represents the first step to compare *in silico* with *in vitro* estimates of LBA.

Preparing Continuing Professional Development Resources for Pharmacists

Jessica Spiteri

Continuing professional development resources on the websites of the American Society of Health-System Pharmacists, the American Pharmacists’ Association and the Pharmaceutical Journal were reviewed. The topics related to chronic diseases were classified, with venous thromboembolism, acute coronary syndrome and diabetes being the most frequently cited. Resources for the local scenario for these topics will be prepared and evaluated.

Using Quality Of Life Tools in English and Maltese

Caroline Maria Vella

Two non-disease specific tools: SF-12v2 and SF-8 and a disease specific tool for diabetes D-39 were translated into Maltese and are being validated. A Maltese translation for the non-disease specific tool SF-36v2 is available. Practicality testing will be carried out for the tools which will be used at the Diabetes Clinic, Mater Dei Hospital.

The Directory of Pharmacists

Marcus Zarb Cousin

A questionnaire is compiled and is distributed to all pharmacists in Malta. This is done by personally handing them out to pharmacists and publishing the questionnaire in the Synapse magazine. Results are collected and trends in the pharmacy profession will be derived and compared to previous issues of the Directory of Pharmacists.
Second Year Students
Project Descriptions
Blood Dyscrasias Due to Chemotherapy
Bernardette Blundell
To analyse the incidence of clinically significant blood dyscrasias in patients receiving chemotherapy. A framework to identify patients with a high risk of developing blood dyscrasias will be proposed and pharmacist interventions in the management of sequelae of blood dyscrasias will be assessed.

Creation of a Two and Three-Dimensional Molecular Database of Drugs used in Ophthalmology
Sarah-Anne Briffa
A database consisting of two and three-dimensional structures of drug molecules used in ophthalmology will be constructed using Symyx, Sybil, VMD and other computational methods. The interaction of these drug molecules with their endogenous receptors will be highlighted.

The Use of Liquid Capsules
Lara Brincat Ruffini
To compare liquid hard capsules with soft gel capsules and other oral solid dosage forms. Factors to be compared include efficacy, safety, appearance, tolerance, effectiveness, quality and patient compliance.

Pharmaceutical Care and the Management of Psychiatric Disorders
Ann Bugeja
To determine whether pharmacist intervention during dispensing in a psychiatric setting affects patient adherence and compliance to medication. Improved methods which could increase patient compliance will be assessed.

Evidence-Based Pharmaceutical Care in Psychiatric Disorders
Claire Bugeja
The general requirements for improved and more effective pharmacist interventions during psychiatric disorder management, including enhanced drug therapy patterns, will be implemented after monitoring and evaluating the current pharmaceutical care plan carried out at Mount Carmel Hospital.

Point-of-Care Testing in Diabetes
Christabel Busuttil
The monitoring of diabetes control will be evaluated. Interpretation of patient self-monitoring of blood glucose levels and point-of-care testing of parameters of relevance in diabetes will be undertaken for a cohort of patients who will be monitored by community pharmacists.

Distribution of Ciprofloxacin to the Peripheries
Francesca Busuttil
A high-performance liquid chromatographic method for the analysis of ciprofloxacin will be developed. The method will be used to determine ciprofloxacin concentrations in peripheral skeletal muscle or subcutaneous tissue and serum in patients suffering from peripheral arterial disease.

The History of Pharmacy in Malta
Angelique Camilleri
A book on the history of pharmacy will be published to stimulate the interest of young generations in pharmacy. The book will include the changes and progress in dispensing methods and the role of the pharmacist throughout the years.

A Compilation of Two and Three-Dimensional Structures of the Drugs used in the Management of Nutrition and Blood Disorders
Kenneth Camilleri
Two and three-dimensional structures of drugs and any of their target receptors used in the management of nutrition and blood disorders will be constructed.

An English-Maltese Dictionary of Medical and Pharmaceutical Terms
Kirsty Camilleri
To compile medical and pharmaceutical terms translated into the Maltese language and validate them with linguists, healthcare professionals and laymen. The amalgamation of the terms with previous works will inspire the publication of the first ‘English-Maltese Dictionary of Medical and Pharmaceutical Terms’.
De Novo Drug Design at the Nicotinic Acetylcholine Receptor

Clarissa Caruana

The nicotinic acetylcholine receptor is a target for smoking cessation. The aim of this project is to use in silico techniques in the design of high affinity ligands for this receptor which are sufficiently bioavailable and non-toxic, making them suitable candidates for drug design studies.

Creation of Two and Three-Dimensional Molecular Database for Anaesthetic Drugs

Jonathan Cefai

A two and three-dimensional structures database of drugs which are used in anaesthesia will be created. Interactions with associated receptors will be highlighted. The database will be an educational tool to visualise the drugs at molecular level.

Simulation Study of Three High Affinity Ligands Obtained from the Common Hawthorne Plant for the Angiotensin Converting Enzyme

Justine Chetcuti

Previous studies have shown that the extract of the Hawthorne plant, comprises three high affinity ligands for the angiotensin converting enzyme. This is a simulation study whereby molecular dynamic techniques will be employed to understand the binding modality of these ligands.

Point-of-Care Testing: Hypercholesterolaemia

Rodianne Conti

The point-of-care testing service in the management of hypercholesterolaemia will be evaluated in community pharmacies. Previous local studies in this field will be reviewed and limitations that have been identified will be assessed. An implementation framework will be proposed.

De Novo Drug Design for the Histamine H₁ Receptor

Michelle Cutajar

The histamine receptor is a target for modulation of allergic symptoms. The aim of this project is to use in silico techniques to design novel high affinity ligands which are sufficiently bioavailable and non-toxic to make them suitable candidates for further studies.

Patient Access to Medication

Attilio Antonio Degiorgio

Access to medication by patients in Malta will be analysed using various measures such as through web systems, the media, telephone and mail. The data collected will be compared to systems in other countries. Proposals to improve access to medication will be suggested.

Formulation of Tolterodine Dosage Forms

Nathaniel Farrugia

The patent of the drug tolterodine (Detrusitol®, Pfizer) expires in 2012, creating an opportunity for the manufacturing of generic and novel formulations. The aim of this project is to identify novel salts of tolterodine and their potential for formulation into suitable, more stable dosage forms.

Creation of a Two and Three-Dimensional Molecular Database of Drugs Used to treat Skin Conditions

Monique Fava

The aim of this project is to create an educational tool by constructing two and three-dimensional databases for structures of drugs used in the management of skin conditions. The interaction of the molecules with their endogenous receptors will be highlighted where relevant.

Haemoglobin Levels in Chronic Drug Use

Rebecca Joslin

The aims of this project are to document the effects of medications on haemoglobin levels in chronic drug use and to investigate the occurrence of adverse effects relating to haemoglobin levels.

Validating the In Vitro Hypothesis that Eicosanoidal Molecules have a High Affinity for Oestrogen and Androgen Receptors

Miguel Manara

In vitro data indicates a positive interaction between eicosanoids and hormonal receptors. This in silico validation study seeks to identify the exact binding modality and affinity of eicosanoids with oestrogen and androgen receptors and will ultimately propose a set of lead molecules for further development.
Pharmaceutical Care in Benign Prostatic Hyperplasia

Janica Mizzi

The role of the pharmacist in the treatment of benign prostatic hyperplasia (BPH) particularly in the early detection and management of the condition will be assessed. Patient education and recommendation of treatment will be carried out. Drug-related problems will be identified and assessed.

Creation of Two and Three-Dimensional Molecular Databases using Drugs Acting in Gastro-Intestinal Tract

Katya Sacco

A two and three-dimensional molecular database of drugs acting on the gastro-intestinal tract will be designed. The relationship between the drug molecule and its endogenous receptors will be highlighted, allowing the delivery of a more holistic approach to education.

Chronopharmacology in Diabetes

Francesca Sammut

The effect of time of insulin administration in relation to glycaemic control will be assessed. Patients suffering from type 1 diabetes on insulin therapy will be monitored using a Continuous Glucose Monitoring System. Fluctuations and trends in glycaemic control in relation to insulin administration will be analysed.

The Pharmacy Department Newsletter and Activities Webpage

Marion Sammut

A newsletter regarding the Department of Pharmacy and its activities will be developed and distributed, in printed and electronic form, to pharmacy students and pharmacists. A webpage will be developed and updated regularly.

Drug Design of a 5-HT Receptor using a Bioisosteric Approach

Maria Schembri

Novel drug molecules will be designed using a bioisosteric approach with the use of available bioisosteric libraries. During this drug design exercise, innovative small molecules which are competent in modulating the biological activity of the 5-HT receptor will be designed.

Developing a Drug Information Bulletin

John Scicluna

Issues of a Drug Information Bulletin for the local market will be developed. This will provide information on new medicines released on the local market and will highlight any changes in the Summary of Product Characteristics of medicines available. The usefulness of the bulletin among pharmacists and pharmacy students will be evaluated.

Point-of-Care Testing: Infectious Diseases

Laura Scicluna

Point-of-care testing of bacterial infections can lead to a faster and evidence-based diagnosis followed by the recommendation of appropriate medication. Applicability and practicality of point-of-care tests for identification of bacterial infections will be studied.

Creation of a Two and Three-Dimensional Molecular Database of Drugs Used in the Management of Conditions Related to the Ear, Nose and Oropharynx

Abigail Spiteri

A two and three-dimensional database of drugs used in the management of conditions related to the ear, nose and oropharynx will be created. The database will make these chemical entities more tangible by highlighting the molecular conformations.

Pharmaceutical Care in Dialysis Patients

Christopher Tate

Pharmacist intervention in the management of renal failure patients on dialysis will be evaluated. Drug-related problems and therapeutic interventions suggested by the pharmacist will be identified and the acceptance rate of such recommendations by the clinical team will be assessed.

Cardiac Markers in Pharmacy Practice

Rebecca Theuma

Although advancements in cardiac markers have been made, a percentage of myocardial infarctions remain undiagnosed. Use of kits to monitor cardiac makers will be evaluated and measures that could lead to improvement in services provided will be investigated and proposed.
Pharmacy Museum
Rebecca Tonna
A pharmacy museum is established. The aim of the museum is to promote education rather than to exhibit rare artifacts, thereby promoting the rational use of medicines which are not to be considered as items of commerce.

Pharmacist’s Perception of Prescribing
Elena Maria Vella
The intervention of pharmacists in repeat prescribing will be evaluated with the potential of establishing protocols to assess potential of pharmacist prescribing in this setting. Patient perception will be evaluated.

Point-of-Care Testing: Urine Analysis and Microalbuminuria
Shaun Ungaro
Implementation of point-of-care testing for urine analysis of microalbuminuria in the primary care setting will be studied. The tests will be assessed in terms of accuracy, reliability and practicality in determining the presence of microalbuminuria and the clinical significance of its presence particularly related to diabetes.

Evidence-Based Pharmaceutical Care in Rheumatoid Arthritis
Jessica Vella
To assess and improve current monitoring of patients being treated with disease-modifying antirheumatic drugs for rheumatoid arthritis. Evidence-based data will be compiled as a guideline on patient monitoring to improve their knowledge and compliance.

Evolution of the Pharmacy-Of-Your-Choice (POYC) Scheme
Marjean Xuereb
Problems encountered with the POYC system by both pharmacists and patients will be identified and investigated. The systems adopted by pharmacies involved in the POYC scheme in different parts of Malta will be assessed and improvements proposed.

Drug Design of a COX-2 Receptor using a Bioisosteric Approach
Ryan Zahra
Novel drug molecules will be designed using a bioisosteric approach. With the aid of available bioisosteric libraries, novel small molecules will be rationally designed which would be capable of successfully modulating the biological activity of the COX-2 receptors.