
PHARMACY PRACTICE



Clinical Pharmacy Services Provided to an Emergency Department

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INTRODUCTION

Patient-oriented (clinical) services provided by pharmacists are now well established. Specialization in areas of pharmacy practice such as critical care, oncology, psychiatry, geriatrics, particularly through decentralized satellites, has been developed. Providing comprehensive clinical services to the Emergency department has only been minimally described in the literature.^{1,2,3} In Canada, McLean and Gervais described a clinical toxicology service provided to an Emergency Department.⁴ To our knowledge, there is no other published account of clinical pharmacy services provided to an Emergency Department in a Canadian hospital.

The purpose of this article is to describe the clinical services provided to an Emergency Department and to present a summary of 100 therapeutic interventions to demonstrate the type of contribution to patient care that is possible.

DESCRIPTION OF THE SERVICES

The Toronto East General and Orthopaedic Hospital is a 600 bed acute care community hospital with teaching affiliation. In May, 1989, a new

critical care wing was opened with ten surgical and eight medical intensive care beds, eight coronary care beds and sixteen intermediate nursing care beds in addition to a new emergency facility designed to meet the needs of 65,000 annual patient visits including one trauma room, four resuscitation beds, a twenty bed observation unit and a twenty-nine bed examination and treatment unit. A critical care satellite pharmacy was incorporated into this new wing to provide all clinical and distributive services to these areas.

Seven critical care pharmacists and the Coordinator, Critical Care Pharmacy Services, provide comprehensive patient-oriented services to the patients of the critical care wing. Six technicians are responsible for drug distribution services to the critical care units. Drug distribution to the Emergency Department is an automatic replacement system performed by pharmacy technicians (0.5 FTE). Prior to the opening of the critical care satellite, clinical services to the Emergency Department were limited to providing nursing inservices and responding to drug information requests. Enhancing the pharmacists clinical role to meet the

needs of patients presenting to an Emergency Department became a departmental priority. Two of the critical care pharmacists (Emergency pharmacists) are assigned the responsibility of providing clinical services to the Emergency Department. These services are provided routinely on day shifts, Monday to Friday and as requested during the hours of opening which are currently 0730 hours to 1930 hours, seven days a week. Each of the two Emergency pharmacists are assigned 50% of their time for clinical duties in the Emergency Department. All critical care pharmacists assist in monitoring Emergency prescriptions while assigned to distribution.

The patient oriented services include: the identification, assessment and intervention in drug related problems by medical chart reviews, medication history-taking and physician-nurse consultation, and when appropriate pharmacokinetic consultations, drug identification, provision of drug and poison information, drug use evaluations, and patient counselling. The Emergency pharmacists provide nursing inservices, Kardex checks, adverse drug reaction monitoring and reporting, developing and maintaining appro-

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appropriate wardstock lists and set stock quotas. They also attend Emergency educational rounds and are involved in teaching fourth year pharmacy students.

1. *Patient Pharmacotherapy Monitoring:*

The Emergency pharmacists monitor pharmacotherapies of selected patients in the Emergency department on a daily basis. Patients are selected for work-up based on a set of priorities developed by the pharmacists. These priorities consist of: patients with drug-related problems identified on the doctor's order, patients on a drug use evaluation medication, patients admitted with a drug overdose requiring medical intervention, or with an adverse drug reaction, patients requiring pharmacokinetic monitoring, potential Critical Care admission, patients with high risk factors for drug related problems (i.e. polypharmacy, elderly, predisposing diseases), and patients who require drug allergy verification.

Emergency pharmacists perform chart reviews, medication history interviews and contact patients' community pharmacies or families in order to assess patients' drug therapies and intervene as necessary to promote rational drug therapy. Pharmacists' involvement at the level of emergency care provides the ability to identify and correct drug-related problems which may have contributed to the patient's admission before the patient is transferred to the floor. Since the pharmacists are present and involved in patient care while the physicians are making initial treatment decisions, there is great opportunity for prospective intervention. A pharmacy care plan for future monitoring is developed. Follow-

up monitoring is taken over by the patient's ward pharmacist after transfer. All clinical information obtained by the Emergency pharmacist is documented on a "Clinical Profile" which remains with the distribution profile of the patient for use by the pharmacists throughout the hospital stay. In addition, if further explanation is necessary, the Emergency pharmacist will discuss important cases with the ward pharmacists.

2. *Medication Histories:*

Medication histories are performed by the Emergency pharmacists on selected patients deemed suitable for interviewing. Patients with drug-related problems identified on the doctor's order or through a chart review are selected as highest priority. The information obtained through the medication history is documented on the patient's clinical profile and any necessary interventions are made. This service has proved to be valuable as it has helped to identify prescribing errors on admission, to identify non-compliant patients who are targeted for discharge counselling, to identify adverse drug reactions and drug interactions, and to identify and assess drug allergies.

3. *Pharmacokinetic Consultations:*

All aminoglycoside serum concentrations and initial dosing are evaluated and appropriate dosage recommendations are made. Serum drug concentrations are also monitored in overdose patients in order to ensure optimum management, and admission levels are monitored in patients exhibiting signs/symptoms of toxicity or lack of therapeutic effect. An important role is the assessment of appropriateness of the orders for serum drug assays. When applicable, recommendations are

made for the correct sampling time in relation to the last dose taken by the patient prior to admission or for the overdose patient.

DESCRIPTION OF INTERVENTIONS

With the implementation of clinical pharmacy services in the Emergency Department at Toronto East General Hospital, the Emergency pharmacists' therapeutic interventions were prospectively documented to assist in demonstrating the pharmacist role in this area. These interventions were evaluated in terms of risk of non-intervention to the patient and degree of acceptance by the medical staff. The categories for the risk of non-intervention were adapted from Folli et al.⁵ At the time of the intervention, the Emergency pharmacist documented the nature of intervention and the degree of acceptance of the recommendation by the physician. More than one "nature of intervention" per recommendation was possible. The recommendation was communicated verbally and/or in writing as deemed appropriate by the Emergency pharmacist. Drug information requests were not included in the data.

Once all the data had been collected, each Emergency pharmacist independently classified the nature of interventions made by the other Emergency pharmacist. In cases where there was a discrepancy in classification, the non-intervening Emergency pharmacist's decision was final. The risk of non-intervention was evaluated by the Director of Pharmaceutical Services and the non-intervening Emergency liaison pharmacist. A total of 115 intervention codes (nature of interventions) were identified from 100 consecutive interventions from January 16 to August 31, 1990.

Eighty-five of 115 (74%) intervention codes involved alteration of

drug therapy (Table I). Within the altered therapy group of interventions, addition and deletion of drug therapy accounted for 13 and 11 percent of alterations respectively. The majority of alterations (62%) involved modification of drug therapy, the largest single category being inappropriate dose (16/50), followed by inappropriate dosing interval (13/50).

Table I: Summary of Drug Therapy Alterations (n = 85)

Addition	11	(13%)
Deletion	9	(11%)
Modification	53	(62%)
Substitution	12	(14%)
	85	(100%)

The remaining interventions involved: drug product identification, serum drug concentration and laboratory test determinations, identification of adverse drug reactions and allergy assessment. The "other" category included all activities that were generated by a potential drug related problem that required assessment but ultimately did not result in alteration of drug therapy. These accounted for seven percent of intervention codes and were evenly divided between verification of appropriateness of drug therapy, prediction of serum levels, assessment of compliance and medication histories without changes in physician orders.

The risk of non-intervention is presented in Table II. The potentially lethal category included: intervention before administration of vera-

Table II: Risk of Non-Intervention to Patient (n = 100)

1. Potentially lethal	2
2. Serious	13
3. Significant	51
4. Somewhat Significant	18
5. Non-significant	16
	100
* adapted from Folli et al (5)	

pamil in a patient with sick sinus syndrome and the discontinuation of theophylline in a patient with theophylline toxicity.

The degree of acceptance of recommendations by physicians was 86%, with an additional 10% accepted with modifications. Of those recommendations accepted with modification 1/10 was in the serious category and 7/10 were in the significant category. Of those rejected 1/4 was in the significant category. No recommendation in the potentially lethal or serious category was rejected.

The clinical activities of Emergency pharmacists provides an opportunity to monitor drug therapy of patients not admitted to hospital and those awaiting a hospital bed. Seventy-two of the interventions could not have been generated from a review of a doctor's order, due to the patient specific nature of the recommendations.

There are limitations in the analysis of the interventions summarized as they do not include the significance rate per number of total patients reviewed, and per number of orders reviewed in the Emergency

Department. In addition, medication histories leading to alteration of therapy were not tabulated as a separate activity. Other limitations include a lack of assessment of final outcome, self reporting methodology and the bias of the evaluators. Although specific criteria for the risk of non-intervention were used for the data collection, ongoing evaluation of the interventions is performed by the Critical Care Coordinator.

The intention of presenting these data is to indicate that clinical pharmacy services should also be provided to patients presenting to an Emergency Department and that the resulting interventions have a high degree of acceptance by physicians. This also suggests the potential value of Emergency pharmacists preventing medication prescribing errors and preventing serious drug related problems. ☒

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