

HIDDEN HARM? ASSESSING MAGNITUDE AND COSTS OF INTRAVENOUS THERAPY ADMINISTRATION ERRORS VIA SMART PUMP REPORTS (5PSQ-112)

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Background and Importance:

Most reviews of intravenous therapy administration error have been undertaken in critical care. In our study wireless pumps gave access to smart pump therapy library log data from lower acuity areas of care such as oncology infusion centres, labor and delivery, and medical-surgical wards. Analysis of the magnitude and costs of errors in these areas has previously been lacking.

Aim and Objectives:

To establish likely incidence of moderate and catastrophic intravenous therapy administration error via 'good catch' data in areas outside of critical care, to identify and classify the medications involved and to estimate likely costs of these errors.

Materials and Methods:

A review of 3,025,414 dose error reduction system protected infusions from adult units outside of critical care across the Middle East for the volume of averted dose/duration errors was undertaken, and a recognized grading of 'moderate' and 'catastrophic'¹ was applied. Projected savings from errors prevented was assessed against current ICU bed and medical ward costs in the Gulf region² and an average length of stay extension identified from the current literature.¹

Results:

Therapy Type	Moderate Totals n. (% vs. DERS Infusions)	Catastrophic Totals n. Magnitude: Times				All Catastrophic Totals n. (% vs. DERS Infusions)
	Magnitude: Times Maximum Rate/Dose	Maximum Rate/Dose				
	1.5 - 9.999	10	10 - 99.999	100	100+	
IV Fluids	35,572 (1.1758)	23	259	4	9	295 (0.0098)
Simple Analgesia	10,844 (0.3584)	62	641	4	53	760 (0.0251)
Antivirals, General Antibiotics and Antifungals	20,277 (0.6702)	84	950	33	67	1,134 (0.0375)
Blood Products	35,830 (1.1843)	325	20	0	4	349 (0.0115)
Chemotherapy and Cytotoxics	11,422 (0.3775)	37	166	4	31	238 (0.0079)
Anticoagulants	2,688 (0.0888)	12	305	24	60	401 (0.0133)
Insulin	313 (0.0103)	31	77	6	37	151 (0.0050)
Electrolytes (K ⁺ and Mg ²⁺)	17,918 (0.5922)	114	725	0	18	857 (0.0283)
GI System	5,688 (0.1880)	153	1,187	5	11	1,356 (0.0448)
Labor and Delivery Meds	111 (0.0037)	6	33	0	5	44 (0.0015)
Aminoglycosides	2,286 (0.0756)	13	179	0	5	197 (0.0065)
Diuretics	549 (0.0181)	34	63	4	38	139 (0.0046)
Steroids	24 (0.0008)	0	0	2	0	2 (0.0001)
Total all Adult	143,522 (4.7439)	894	4,605	86	338	5,923 (0.1958)

Conclusion and Relevance:

The study identified an incidence rate above those in many published studies, this may be because we 'cast the net wider' and because in the areas studied there was limited clinician experience of administration of some of the medications. Competency is difficult to maintain with limited exposure to a task. The presence of insulin, potassium preparations, and cytotoxics in our results is in line with other studies. The cost savings indicate the potential value of smart intravenous technology being deployed in every part of the hospital.

Applying 1.886% as a gross reference for all catastrophic events³ in general adult care areas for the risk of severe harm, the total LOS resulting from these injuries as 4.8 days¹ and an ICU bed rate of 2,082 (± 345) USD per day² we arrive at 9,993 (8,340.53 – 11,652.92) USD per event. This equates to 369 USD (308-430) as an averted extra burden for every 1,000 infusions given from within the DERS. For a 1,000-bed hospital giving 750,000 to 1.2 million infusions per year⁴ and assuming a compliance rate of 90%⁴ this would equate to between 249,075-442,000 USD per annum in ICU costs alone.

Extending these costs to moderate harm causing extra LOS in a Medical Ward bed is difficult to assess but given the cost of a medical ward bed per day is 1384 (± 166) USD the true averted burden for the average 1,000 bed hospital could be of a far greater magnitude.

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