



## Are Medication Orders in Fictional Medical-themed Television Shows Accurate? A Retrospective, Observational Study

Alexas O. Polk<sup>1</sup>, Sarah E. DeMott<sup>2</sup>, Phillip L. Mohorn<sup>3</sup>, Amy J. Yanicak<sup>4</sup>,  
Meagan C. Miles<sup>5</sup>, Gabrielle L. Furgiuele<sup>6</sup>, Monica R. Litsas<sup>7</sup>, Kristen G. Scott<sup>8</sup>,  
Andrew W. Sides<sup>9</sup> and P. Brandon Bookstaver<sup>10\*</sup>

<sup>1</sup>St. Joseph's/Candler Health System, University of Georgia Savannah, GA, USA.

<sup>2</sup>University of Virginia Health System, Charlottesville, VA, USA.

<sup>3</sup>Department of Pharmacy, Spartanburg Medical Center, Spartanburg Regional Healthcare System, Spartanburg, SC, USA.

<sup>4</sup>Providence St. Peter Hospital, Olympia, WA, USA.

<sup>5</sup>Moses H. Cone Memorial Hospital, Greensboro, NC, USA.

<sup>6</sup>University of Florida Health Shands Hospital, Gainesville, FL, USA.

<sup>7</sup>Maine Medical Center, Portland, ME, USA.

<sup>8</sup>South Carolina College of Pharmacy, University of South Carolina, Columbia, SC, USA.

<sup>9</sup>Division of General Internal Medicine, University of South Carolina School of Medicine Columbia, SC, USA.

<sup>10</sup>Department of Clinical Pharmacy and Outcomes Sciences, South Carolina College of Pharmacy, University of South Carolina, Columbia, SC, USA.

### Authors' contributions

Authors AOP, SED, PLM, PBB conceived and designed the study. Authors AOP, SED, AJY, MCM, GLF, MRL, KGS acquired data. Authors AOP, SED, PLM, AWS, PBB analyzed and interpreted data, as well as, drafted and critically revised the manuscript. Author PLM conducted statistical analysis. Authors AOP, SED obtained grant funding. Authors PLM, AWS, PBB supervised the study.

### Article Information

DOI: 10.9734/BJMMR/2016/28408

#### Editor(s):

(1) Boyd D. Burns, Residency Director & Vice Chair of Academic Affairs, Department of Emergency Medicine, The University of Oklahoma School of Community Medicine-Tulsa, USA.

#### Reviewers:

(1) P. Ravi Shankar, Department of Medical Education Xavier University School of medicine Aruba, Netherlands.

(2) Keith Jansa, Medical Informatics, 1387 Beaucourt Place, Ottawa, Canada.

(3) Josabeth Hultberg, Linköping University, Sweden.

(4) Rajendra Nath, King George's Medical University, Lucknow (UP), India.

Complete Peer review History: <http://www.sciencedomain.org/review-history/16133>

Original Research Article

Received 18<sup>th</sup> July 2016  
Accepted 30<sup>th</sup> August 2016  
Published 10<sup>th</sup> September 2016

## ABSTRACT

**Objective:** To determine the degree of accuracy of medication orders in fictional medical-themed television shows.

**Design:** Retrospective, observational, study

**Setting:** A review of available US fictional medical-themed television shows identified via an Internet Movie Database search of shows originally airing from September 1989 to May 2014.

**Participants:** 4,854 medication orders from 33 unique fictional, medical-themed television shows

**Primary Outcome Measures:** Percentage of accurate medication orders; type of medication order and error, if applicable.

**Results:** The analysis revealed that 88.1% of medication orders were accurate with an average of 2.06 medication orders per episode. Orders from five shows were 100% accurate. The most common categories of drugs prescribed were antidysrhythmics/vasopressors/ACLS agents (21.6%), anti-infectives (14.9%), and analgesics/antipyretics (12.5%). The medications coincide with the most common medication indication categories seen: trauma, cardiovascular, and infectious diseases. The most common reason for inaccuracy was incorrect dose, representing 44.6% of errors; followed by inappropriate indication (43%). Medication orders prescribed in children (<18 years), using generic names, for acute cardiovascular indications, and given intravenous route were significantly more common among inaccurate orders.

**Conclusions:** The information in verbal medical orders provided, while incomplete, contains accurate information, with final analysis of the medication orders from fictional medical-themed television shows demonstrating overall accuracy. Evaluation was limited however as many verbal orders were incomplete with no dose given or lack of detailed indication.

*Keywords: Medications; media; television; medication errors; fictional.*

## 1. INTRODUCTION

Television (TV) shows have provided unparalleled entertainment, served as a constant portal to information, and helped shape society since the 1940's. Many individuals perceive a large portion of what they see on television to be true. Furthermore, television serves as one of the primary sources of health information for millions of people, whether in the form of televised medical talk shows or fictional dramas [1]. However, this may be dangerous to patients and individuals working or training to become healthcare professionals. Over 80% of medical and nursing students watch medical television dramas [2] and over 88% of Americans learn about health issues from television [3].

In one analysis of 136 cardiac arrests and subsequent cardiopulmonary resuscitation (CPR) attempts on the TV Show *ER*, only one CPR scene was in accordance with the American Heart Association Guidelines, and, contrary to good medical practice, patients had better outcomes when low-quality CPR or non-compliance with the guidelines was executed [4]. In another analysis of 65 seizure episodes in four prominent medical dramas, first aid management of seizures by actors portraying health professionals was inappropriate in approximately

half of all cases. Inappropriate seizure aid activities witnessed included, putting a foreign object into the patient's mouth (11%), physically restraining the patient (17%), and attempting to stop the seizure movements (10%) [5].

To avoid mistakes in medical dramas, the Hollywood, Health & Society program (funded by donors such as, the Centers for Disease Control and Prevention [CDC], National Cancer Institute, and Bill and Melinda Gates Foundation) was created in 1994. The program provides free medical advice to writers and producers through quick facts and tip sheets. However, none of these tip sheets include any information about medication indications, dosages, dosage forms, or medication strengths [6]. Through its Entertainment Education Programs, the CDC holds staff meetings for show creators and network officials along with offering expert panel discussions. In 2000, the Sentinel Health Awards were created by the CDC and the Hollywood, Health & Society program in order to recognize certain TV dramas that promote health topics and raise audience awareness [3]. While it is vital for script writers to utilize the aforementioned resources and knowledgeable medical consultants, it is unknown if they have had an impact on the accuracy of medical information on TV.

The goal of this study is to determine the accuracy of medication orders in fictional, medical-themed TV dramas and the extent to which these shows are portraying accurate or inaccurate information to the lay public.

## 2. METHODS

This was a retrospective study of all medication orders from any provider, including physicians, physician assistants, nurses and other health care providers, in complete seasons of fictional, medical-themed TV shows originally airing from September 1989 through May 2014. A comprehensive search of the Internet Movie Database (IMDB), (<http://www.imdb.com>), for shows categorized as “medical series” was conducted. Shows originally airing in other countries or those not readily retrievable in the United States were excluded. Shows currently airing were included; however, only completed seasons were reviewed. Medication orders were documented in a standardized spreadsheet with patient demographics, prescriber information, medication indication, and medication information, including dose, route, and frequency being primary data points ascertained by the study investigators. Data collectors, including pre-pharmacy students and pharmacy students, were looking for errors among these primary data points and evaluated each order using appropriate evidence-based medical and medication information resources accurate at the show’s airing, including prominent medication information databases like LexiComp® and Micromedex®, and pertinent published US and/or global guidelines. A panel of investigators, including the data collectors, clinical pharmacists, and a physician, conducted a follow-up analysis to validate the individual findings and consulted medical or pharmacy specialists, as needed. Investigators also analyzed completeness of the medications ordered by the healthcare provider.

All medication orders were included for analysis of accuracy regardless of completeness. Complete orders were defined as orders that contained a disease state indication, medication name, dose, route of administration and frequency/rate. Accuracy was defined as the medication, including any information available (eg. dose, route, frequency), being deemed appropriate based on indication and patient demographics provided. The medication was correct if deemed a first-line or alternative therapy for the described indication. A non-FDA approved indication may still be accurate if it was

considered a first- or alternate therapy for the indication presented at the time of airing. As an example, metronidazole is not FDA-approved for *Clostridium difficile* infection, but has long been considered an accepted primary therapy. In the case of incomplete orders, only available information provided was evaluated for accuracy. As an example, if an order included a medication and the disease state for which it was ordered without any other distinguishing information (eg. dose or route), the order was assumed accurate based on the medication having utility for the disease state. A medication was also considered inaccurate if it was unavailable in the United States during the year the episode aired.

In order to standardize the accuracy of these medication orders, investigators used uniform definitions with certain parameters. To keep all pediatric medication order information consistent, a standardized weight was used among the collectors based on average weights for various pediatric age groups (newborns= 3kg, infants=7 kg, toddlers= 12 kg, big kids= 25 kg, teens=45 kg), if the weight of the child was not stated in the scene. The aforementioned weights were determined based average of the weight range for a given age group to formally evaluate weight-based dosing. These standardized weights were only used to verify if the dose was appropriate in the scene and were not analyzed further. The ages for children were also standardized by newborn=0-1 month, infant=1-12 months, and child/adolescent 1-18 years. To account for readily available dosage forms, a rounding up or down of ten percent for each dosage, if necessary, was implemented. Following final determination of accuracy by the panel of investigators, data were largely analyzed using descriptive statistics. Comparisons of characteristics between orders that were accurate and inaccurate were analyzed using chi-square or Fisher’s exact test for categorical data. Mann–Whitney U test and Student t-test were used for ordinal and continuous data, depending on distribution of the data. A two-sided *P* value of <0.05 was considered statistically significant. SPSS (version 20 for Windows; SPSS Inc.; Chicago, IL) was used to perform all statistical analyses.

## 3. RESULTS

An analysis was conducted on 4,854 medication orders from 33 different fictional medical-themed TV shows. The analysis revealed that 88.1% (n=4,276) of medication orders were accurate

with an average of 2.06 medication orders per episode. There were five shows in which all medication orders were 100% accurate. These shows included *Becker* [1998-2004] (n=13), *Combat Hospital* [2011-] (n=41), *Do No Harm* [2013] (n=6), *Northern Exposure* [1990-1995] (n=30), and *The Mindy Project* [2012] (n=3). While one fictional medical-themed TV show, *Getting On* [2013-], had no medication orders, the largest number of medication orders came from *ER* [1994-2009] (n=2145), *Strong Medicine* [2000-2006] (n=486), *House, M.D.* [2004-2012] (n=484), and *Grey's Anatomy* [2005-] (n=370). Percentages of inaccurate medication orders by show are detailed in Table 1.

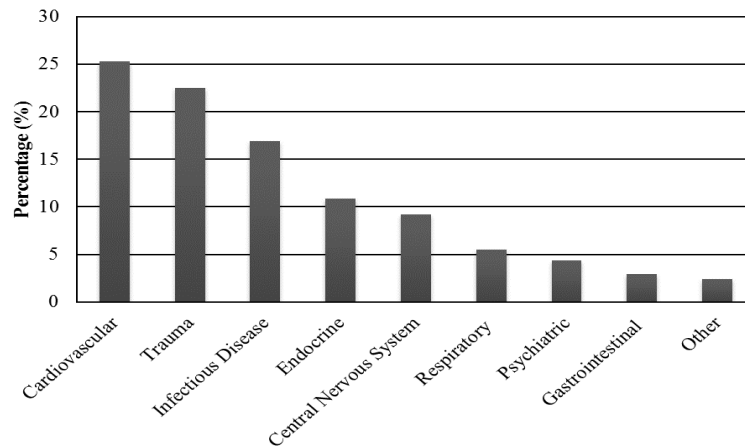
Analysis revealed the most common prescribers were physicians, who initiated 95.5% of the medication orders. The most common categories of drugs prescribed were antidysrhythmics/vasopressors/Advanced Cardiac Life Support

(ACLS) agents (21.6%), anti-infectives (14.9%), and analgesics/ antipyretics (12.5%). These types of medications coincide with the most common disease states treated (Fig. 1) which were trauma (30.6%), cardiovascular (22.4%), and infectious diseases (13.3%). The most common reason for inaccuracy (Table 2) was medication dose (44.6%, n=258) followed closely by inappropriate medication use for the indication (43%, n=249).

When compared to accurate orders, inaccurate orders occurred in a significantly greater proportion of newborns (3.5% vs. 1.7%, p=0.008), infants (6% vs. 3.3%, p=0.002) and adolescents (< 18 years of age) (23% vs. 19%, p=0.021). There was no difference among race or gender between accurate and inaccurate orders. Only 141 medication orders were for pregnant women, of which 13.5% were inaccurate.

**Table 1. Percentage of inaccurate medication orders by Television Show<sup>1</sup>**

Television show [Years Aired]	Episodes	Orders/Episode	Percent inaccurate (n)
Children's Hospital [2008-]	63	0.09	50% (3/6)
Emily Owens, M.D. [2012-2013]	13	3.39	36.4% (16/44)
Medical Investigation [2004-2005]	20	3.8	22.4% (17/76)
Nip/Tuck [2003-2010]	100	0.42	21.4% (9/42)
General Hospital: Night Shift [2007-]	27	1.30	20% (7/35)
Saving Hope [2012-]	31	3.61	19.6% (22/112)
Scrubs [2001-2010]	182	0.27	18.4% (9/49)
Nurse Jackie [2009-]	66	0.62	17.1% (7/41)
Doc [2001-2004]	88	0.07	16.7% (1/6)
House, M.D. [2004-2012]	176	2.75	16.3% (79/484)
Three Rivers [2009-2010]	14	3.64	15.7% (8/51)
Diagnosis Murder [1993-2001]	180	0.51	14.3% (13/91)
A Gifted Man [2011-2012]	16	3.94	14.3% (9/63)
Miami Medical [2010-]	13	5.23	11.8% (8/68)
ER [1994-2009]	331	6.48	11.1% (238/2145)
Private Practice [2007-2013]	111	1.01	10.7% (12/112)
Strong Medicine [2000-2006]	132	3.68	10.5% (51/486)
Hawthorne [2009-2011]	30	1.60	10.4% (5/48)
Royal Pains [2009-]	80	1.49	10.1% (12/119)
Chicago Hope [1994-2000]	140	0.914	9.4% (12/128)
Grey's Anatomy [2005-]	220	1.682	8.4% (31/370)
Monday Mornings [2013]	10	1.20	8.3% (1/12)
The Mob Doctor [2012-2013]	13	2.92	7.9% (3/38)
Doogie Howser, M.D. [1989-1993]	97	0.29	7.1% (2/28)
Trauma [2009-2010]	18	2.28	4.9% (2/41)
Mercy [2009-2010]	22	1.05	4.3% (1/23)
Off The Map [2011]	13	3.23	2.4% (1/42)
Becker [1998-2004]	129	0.10	0%(0/13)
Combat Hospital [2011-]	13	3.15	0%(0/41)
Do No Harm [2013]	13	0.46	0%(0/6)
Northern Exposure [1990-1995]	110	0.27	0%(0/30)
The Mindy Project [2012-]	46	0.07	0%(0/3)
Getting On [2013-]	6	0	0%(0/0)



**Fig. 1. Overall frequency of medication orders by indicated disease state (N=4,854)**

The analysis of errors by disease state (Fig. 2) showed that most errors occurred in patients with cardiovascular (29%), trauma (25.4%) or infectious disease (16.1%) conditions, all of which were significantly more common among inaccurate orders. The use of generic names was significantly more common among inaccurate versus accurate orders (72% vs 60%,  $p < 0.001$ ). Medications ordered as intravenous route and those from the antidysrhythmic/vasopressor/ACLS class were significantly more common among inaccurate versus accurate orders. Orders for fluids or analgesics were less likely to be inaccurate. Further details are available in Tables 3 and 4.

Only 276 orders (5.7%) were complete, of these, 83.3% ( $n=230$ ) were deemed accurate. Among the incomplete orders, 52.7% were missing a dose, 64% were missing a route of administration and 86.9% were missing a frequency/rate.

**Table 2. Reasons for medication order inaccuracy**

Reason	N (%)
Dose	258 (44.6%)
Drug	249 (43.1%)
Administration	34 (5.9%)
Fake/Fictitious Medication	23 (4%)
Frequency	12 (2.1%)
Other	3 (0.5%)

#### 4. DISCUSSION

The results of the present study indicate that viewers should be cautious when watching medical dramas due to relative inaccuracy and commonplace of incomplete orders. Korownyk et

al. [7] concluded that consumers should be skeptical about recommendations provided on TV shows. Our study found that 88.1% of medication orders in fictional medical-themed TV shows were accurate, and 84.3% were deemed incomplete. There were significant differences in accuracy between TV shows, although ER with the most orders (2,145) had an accuracy rate of 88.9%. The relatively low number of complete orders is inconsistent with the values of medication safety and does not reflect 'real-world' prescribing. A similar study investigating medical talk shows such as, *The Dr. Oz Show* and *The Doctors*, found that half of the recommendations have either no evidence or are contradicted by the best available evidence. Korownyk et al. [7] also found that potential conflicts of interest are rarely addressed during such talk shows.

There is potential for major discrepancies in the general public's knowledge and what is depicted on fictional TV shows and movies, highlighting educational opportunities. Evidence shows that the general population feels pharmacists are one of the most trusted and accessible health care providers; contradicting a study that looked at pharmacists' portrayal in the media, which found that pharmacists are most frequently portrayed as villains in both movies and television shows [8]. As such, it seems pertinent to use this platform to educate the public about the dangers of mimicking medical advice/procedures as seen on TV. Hinklebein et al. analyzed the media effect on public perception of proper seizure assistance. Fictional health care professionals performed 43.1% of seizure aid inappropriately while the lay public, which viewed these clips, considered 89.2% of seizure assistance to be

performed appropriately [5]. In a further study investigating the exaggerated effects of medical fiction shows, Van den Bulck et al demonstrated a direct relationship between the consumption of medical TV dramas and the overestimation in chances of survival following cardiopulmonary resuscitation [9]. The present study further serves as a catalyst to initiate efforts for educating the general public on the potential harm in reliance on fictional television for accurate medical advice.

There are numerous explanations for the higher than expected accuracy rate in the present study. All potential therapies including first-line or alternative therapies for a specific disease state were acceptable if there was no other error in the medication order. Furthermore, medication orders would normally be considered inaccurate if they are incomplete, leading to potential medication errors. In the present study, only information verbalized or readily available in the scene was evaluated for accuracy. Given the small number of complete orders (n=276), considering only those with complete orders decreases the accuracy rate to 83%. In several instances the medication ordered was a non-FDA approved compound, fictitious or completely

erroneous. For example, in *House, M.D.* "Damned If You Do," a 60-year-old white man comes to the clinic with inflammatory bowel syndrome and complaints of bloody diarrhea [10]. Dr. Gregory House's cure is one cigarette twice a day. While this represents a seemingly bizarre remedy, this recommendation could easily be replicated by the general public without obtaining any sort of medical advice from a healthcare professional. During several dramatic codes in *ER*, physicians and other health care providers ordered "high-dose epi", defined as a 5 mg dose or 0.1 mg/kg to be considered only once a standard dose of epinephrine has failed, per the Adult Advanced Cardiac Life Support guidelines of 1992 [11]. Episodes which displayed these orders originally aired in the early 1990's when "high-dose epi" was common practice; however, studies have shown it no more effective than normal doses of epinephrine and thus, the practice has fallen by the wayside. In *Nip/Tuck* "Derek, Alex, and Gary," a male teenager is prescribed "Jeblovox" allegedly for depression and in the episode "Reefer," "Hyaluronadef" was prescribed to relieve pressure on a 40-year-old woman during surgery.

**Table 3. Differences in patient characteristics between accurate and inaccurate orders**

Variable	Accurate order (n=4275)	Inaccurate order (n=579)
<b>Age, years*</b>		
Newborn (0 – 1 month)*	72 (1.7)	20 (3.5)
Infant (1 – 12 months)*	139 (3.3)	35 (6.0)
Adolescent (1 – 18 years)*	801 (18.7)	132 (22.8)
19-29	801 (18.7)	93 (16.1)
30-65	2074 (48.5)	259 (44.7)
>66	251 (5.9)	25 (4.3)
Unknown	137 (3.2)	15 (2.6)
<b>Gender</b>		
Female	1851 (43.3)	256 (44.2)
Male	2352 (55.0)	308 (53.2)
Other	5 (0.1)	1 (0.2)
Unknown/Not available	67 (1.6)	14 (2.4)
<b>Race</b>		
Caucasian/White	3040 (71.1)	431 (74.4)
African American/Black	628 (14.7)	78 (13.5)
Latin American/Hispanic	269 (6.3)	23 (4.0)
Asian	118 (2.8)	21 (3.6)
Middle Eastern	42 (1.0)	2 (0.3)
Indian	29 (0.7)	4 (0.7)
Native American	8 (0.4)	0 (0.0)
Other	18 (0.4)	5 (0.9)
Unknown/Not available	123 (2.9)	15 (2.6)
<b>Pregnant</b>		
Yes	122 (2.9)	19 (3.3)
No	4153 (97.1)	560 (96.7)

\*p<0.05, deemed statistically significant

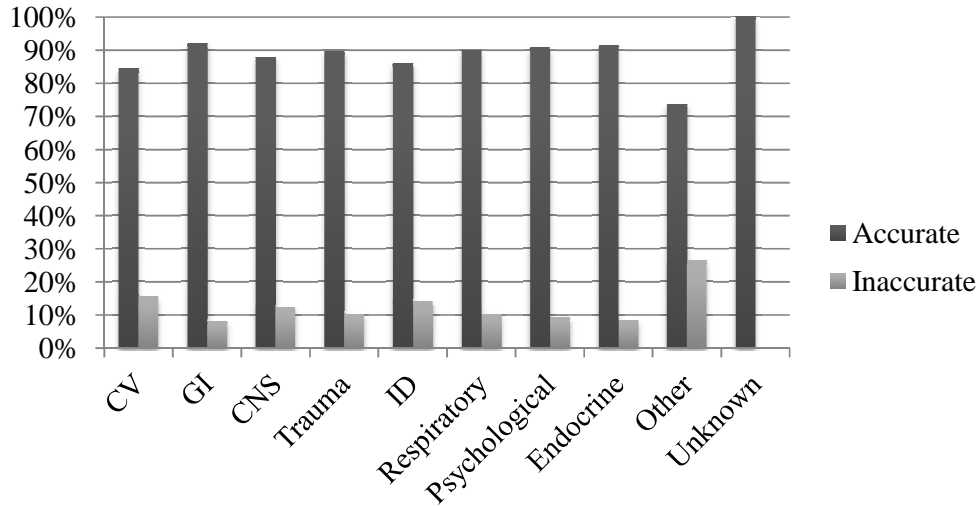
**Table 4. Differences in medication order characteristics between accurate and inaccurate orders**

<b>Variable</b>	<b>Accurate order (n=4275)</b>	<b>Inaccurate order (n=579)</b>
<b>Disease state category*</b>		
Cardiovascular*	919 (21.5)	168 (29.0)
Gastrointestinal	139 (3.3)	11 (1.9)
Central nervous system	343 (8.0)	48 (8.3)
Trauma*	1340 (31.3)	147 (25.4)
Infectious diseases*	553 (12.9)	93 (16.1)
Respiratory	324 (7.6)	37 (6.4)
Psychiatry	156 (3.6)	17 (2.9)
Endocrine*	460 (10.8)	44 (7.6)
Unknown*	41 (1.0)	14 (2.4)
<b>Medication name used*</b>		
Generic*	2548 (59.6)	416 (71.8)
Brand*	862 (20.2)	82 (14.2)
Not specified/Not applicable*	865 (20.2)	81 (14.0)
<b>Medication class*</b>		
Antimicrobial	635 (14.9)	88 (15.2)
Cardiovascular	285 (6.7)	48 (8.3)
Analgesic/Antipyretic*	570 (13.3)	36 (6.2)
Corticosteroid/Immunomodulator	243 (5.7)	34 (5.9)
Anticoagulant	88 (2.1)	20 (3.5)
Antidysrhythmic/Vasopressor/ACLS*	897 (21.0)	151 (26.1)
Fluid*	264 (6.2)	10 (1.7)
Vaccine/Antitoxin	124 (2.9)	18 (3.1)
Sedative/Paralytic	387 (9.1)	54 (9.3)
Respiratory	59 (1.4)	3 (0.5)
Anticonvulsant	128 (3.0)	15 (2.6)
Antiemetic	57 (1.3)	3 (0.5)
Antipsychotic/Antidepressant	122 (2.9)	9 (1.6)
Gastrointestinal	45 (1.1)	10 (1.7)
Endocrine	144 (3.4)	22 (3.8)
Other*	227 (5.3)	58 (10.0)
<b>Prescriber</b>		
Physician	4079 (95.4)	556 (96.0)
Nurse	68 (1.6)	9 (1.6)
Physician Assistant	10 (0.2)	1 (0.2)
Other Health Care Professional	118 (2.8)	13 (2.2)
<b>Medication route of administration*</b>		
Intravenous*	1044 (24.4)	175 (30.2)
By mouth	166 (3.9)	16 (2.8)
Injection	205 (4.8)	31 (5.4)
Rectal	12 (0.3)	1 (0.2)
Sublingual	7 (0.2)	5 (0.9)
Topical	46 (1.1)	4 (1.4)
Other Route	30 (0.7)	8 (1.4)
Not specified*	2765 (64.7)	339 (58.5)
<b>Medication order completeness*</b>		
Complete	230 (0.05)	46 (0.08)
Incomplete	4045 (94.6)	533 (92.1)

\* $p < 0.05$ , deemed statistically significant

In the era of readily available media through outlets such as Netflix® and archived TV shows on digital media, access to past episodes is more commonplace. The danger lies in the interpretation of medication orders or medical advice at the time of viewing, as opposed to the

time of original airing. Our study assessed accuracy only based on available evidence at the time of the show's original airing. Sydney Burwell, past Dean of Harvard Medical School, is famously quoted as saying "Half of what you are taught as medical students will in 10 years



**Fig. 2. Accuracy of medication orders by indicated disease state (N=4,854)**  
 CV=Cardiovascular; GI=gastrointestinal; CNS=central nervous system; ID=infectious diseases  
 Unknown means that the indication was not provided or unclear at the time of medication order.

have been shown to be wrong.” [12]. While that sentiment has not been scientifically validated to our knowledge, it speaks to the dynamic field of medicine. Over 800,000 new citations were published and indexed in Medline in 2015, and since 1990, there has been a nearly 350% increase in the total number of citations, attesting to the growing body of available evidence [13]. Fifteen (45%) of the medical shows in this investigation had their final airing in 2010 or prior, leading to significant opportunity for medication errors if taken in present day context.

**5. CONCLUSIONS**

While the percentage of inaccurate medication orders was not as high as originally anticipated, a significant number of errors do occur in fictional medical shows. The significant number of incomplete orders does not represent ‘real-world’ prescribing. This research serves to bring awareness of erroneous medication information portrayed on television and to reiterate the importance of seeking medical advice and medication information from appropriately licensed professionals.

**CONSENT**

It is not applicable.

**ETHICAL APPROVAL**

It is not applicable.

**ACKNOWLEDGEMENTS**

The following authors were students at the South Carolina College of Pharmacy, University of South Carolina (USC) at the time of study: Alexas Polk, PharmD; Sarah DeMott, PharmD; Amy Yanicak, PharmD; Megan Miles, PharmD; Gabrielle Furgieue, PharmD; Monica Litsas, PharmD. Phillip Mohorn, PharmD was a Clinical Assistant Professor at USC at the time of study. These data were presented in part at the American Pharmaceutical Association Annual Meeting in San Diego, CA March 2015, Abstract #391. We acknowledge the following people for their contributions in data collection: Caroline Arnette, Alyssa Berganini, Elisabeth Caulder, Jessica Humphries, Aimee Melling, Nicolette Portela, Connor Smith, Chelsea Wilson and Gil Whitworth.

**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

**REFERENCES**

1. Ye Y, Ward KE. The depiction of illness and related matters in two top-ranked primetime network medical dramas in the United States: a content analysis. *J Health Commun.* 2010;15(5):555-70.
2. Czarny MJ, Faden RR, Nolan MT, Bodensiek E, Sugarman J. *Medical and*



- Nursing Students' Television Viewing Habits: Potential Implications for Bioethics. *The American Journal of Bioethics*. 2008;8(12):1-8.
3. Entertainment Education Atlanta, GA: Centers for Disease Control and Prevention 2015 [updated April 23, 2015; cited 2015 September 3, 2015]. Available:<http://www.cdc.gov/healthcommunication/toolstemplates/entertainmented/>
  4. Hinkelbein J, Spelten O, Marks J, Hellmich M, Bottiger BW, Wetsch WA. An assessment of resuscitation quality in the television drama *Emergency Room*: guideline non-compliance and low-quality cardiopulmonary resuscitation lead to a favorable outcome? *Resuscitation*. 2014;85(8):1106-10.
  5. Moeller AD, Moeller JJ, Rahey SR, Sadler RM. Depiction of seizure first aid management in medical television dramas. *Can J Neurol Sci*. 2011;38(5):723-7.
  6. Hollywood Health & Society Beverly Hills, CA: USC Annenberg Normal Lear Center; 2014 [updated 2014; cited 2015 September 3, 2015]. Available:<https://hollywoodhealthandsociety.org>
  7. Korownyk C, Kolber MR, McCormack J, et al. Televised medical talk shows--what they recommend and the evidence to support their recommendations: a prospective observational study. *BMJ*. 2014;349:g7346.
  8. Yanicak A, Mohorn P, Monterroyo P, Furgiuele G, Waddington L, Bookstaver PB. Public perception of pharmacists: Film and television portrayals from 1970 to 2013. *J Am Pharm Assoc* (2003). 2015;55(6):578-86.
  9. Van den Bulck JJ. The impact of television fiction on public expectations of survival following in-hospital cardiopulmonary resuscitation by medical professionals. *Eur J Emerg Med*. 2002;9(4):325-9
  10. Internet Movie Database (IMDb) [Internet]. Amazon Affiliates; 2016 [cited 2016 July 2]. Available: <http://www.imdb.com>
  11. Adult Advanced Cardiac Life Support. *JAMA*. 1992;268(16):2199-241.
  12. Pickering GW. *The Purpose of Medical Education*. *BMJ*. 1956.
  13. U.S. National Library of Medicine. Detailed Indexing Statistics: 1965-2015. Rockville Pike: PubMed; 2003. [Updated April 5, 2016; cited 2016 June 28, 2016.] Available:[https://www.nlm.nih.gov/bsd/index\\_stats\\_comp.html](https://www.nlm.nih.gov/bsd/index_stats_comp.html)

© 2016 Polk et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*  
*The peer review history for this paper can be accessed here:*  
<http://sciencedomain.org/review-history/16133>