

# Opioid dependence and the use of analgesics in a Swiss teaching hospital

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## Introduction

The opioid epidemic in the US is characterised by increasing consumption of and dependence on opioids. A recent population study of Swiss insurance claims between 2006 and 2013 showed marked increases in the use of opioids and other analgesics [1]. We investigated (a) whether this increase is reflected by opioid dependence among our inpatients, and (b) whether changes of in-hospital orders for analgesics might have contributed to such a trend.

## Methods

We retrospectively analysed hospital-wide data of inpatients discharged between 2011 and 2016 from an academic medical centre (850 beds) in Switzerland. Opioid dependence was identified by the ICD-10 code F11.2. Coding procedures did not change over the study period. Diagnoses were listed at discharge by treating physicians. Subsequently, professional DRG coders were in charge of quality control based on patient records. We used the anatomical therapeutic chemical (ATC) classification system to group orders for analgesics into “opioids” (e.g., morphine and oxycodone; ATC codes N02A\*), “anti-inflammatory and antirheumatic products, non-steroids” (e.g., diclofenac and mefenamic acid; M01A\*), and “other analgesics and antipyretics” (e.g., acetaminophen and metamizole; N02B\*). Free-text order entries were also considered and mapped to ATC codes by an iterative semi-automated process, resulting in ATC coding of >96.5% of all drug orders for each year considered. Linear regression models, fitted by the software R (R Foundation for Statistical Computing, Vienna, Austria), analysed trends (fig. 1) and for each drug group (table 1).

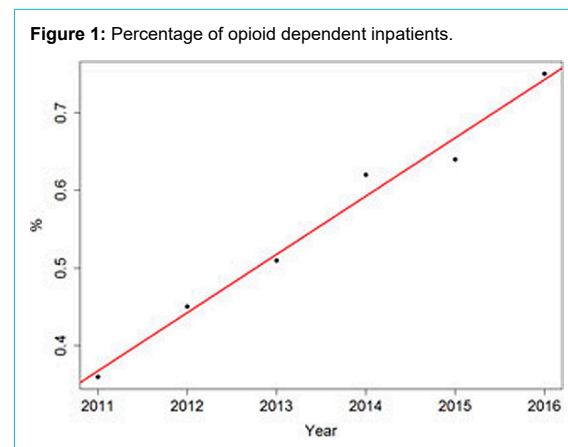
## Results

A total of 205,833 inpatient stays with 6,382,275 drug orders were analysed. Of these, 19.5% concerned analgesics (1,242,247). The proportion of inpatients with a diagnosis of opioid dependence remained below 1%, but showed a linear increase and doubled during the study period ( $p < 0.0002$ ; fig. 1). The total number of orders per stay increased from 2011 to 2016 (table 1). Interestingly, the

number of scheduled opioid administrations statistically significantly increased, but no significant change was observed in the total number of opioid orders (including the *pro re nata* (if required) orders, which represent >80% of opioid orders). However, a statistically significant increase was observed in a subgroup analysis of metamizole, a potent analgesic frequently used in Switzerland. The marketing authorisation of metamizole in the US was withdrawn in 1977 because of its association with agranulocytosis.

## Discussion and conclusions

1. The percentage of inpatients suffering from opioid dependence increased significantly year by year, doubling within the 6-year period considered. This finding might add to the growing concern that the US opioid epidemic could become an opioid pandemic. Nonetheless, the data reported here show a low percentage of opioid dependence among patients treated in this Swiss academic medical centre. Thus, the local situation observed does not reflect the US experience so far.
2. In contrast to the increase of opioid dependence, the total number of opioid orders, including *pro re nata* orders, remained stable. For the low fraction of scheduled opioid administrations (<18%), however, we observed a significant increase over time. Nevertheless, the hypothesis that the observed increase of opioid de-



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**Table 1:** Number of drug orders, orders for opioids, NSAIDs, and other analgesics, by study year.

	2011	2012	2013	2014	2015	2016	p-value
<b>Total</b>							
Drug orders per stay	26.62	30.13	30.66	31.15	32.31	34.50	<b>0.003</b>
Opioid (N02A*) orders per stay	1.43	1.87	1.91	1.88	1.87	1.93	0.126
NSAID (M01A*) orders per stay	0.50	0.57	0.52	0.51	0.52	0.46	0.268
Other analgesic (N02B*) orders	3.28	3.70	3.71	3.65	3.72	3.89	0.053
Subgroup metamizole (N02BB02)	1.38	1.59	1.59	1.57	1.61	1.72	<b>0.035</b>
<b>1. Orders per schedule</b>							
Drug orders per stay	19.24	20.64	20.55	21.48	22.04	23.66	<b>0.002</b>
Opioid (N02A*) orders per stay	0.28	0.26	0.28	0.31	0.35	0.36	<b>0.010</b>
NSAID (M01A*) orders per stay	0.31	0.32	0.28	0.30	0.31	0.28	0.300
Other analgesic (N02B*) orders	1.76	1.99	1.96	1.95	1.94	2.02	0.148
Subgroup metamizole (N02BB02)	0.75	0.85	0.84	0.86	0.86	0.92	<b>0.023</b>
<b>2. Pro re nata (if needed)</b>							
Drug orders per stay	7.39	9.49	10.11	9.67	10.26	10.84	0.030
Opioid (N02A*) orders per stay	1.15	1.61	1.63	1.56	1.52	1.56	0.298
NSAID (M01A*) orders per stay	0.19	0.25	0.25	0.22	0.21	0.18	0.479
Other analgesic (N02B*) orders	1.52	1.70	1.75	1.70	1.78	1.87	<b>0.017</b>
Subgroup metamizole (N02BB02)	0.63	0.74	0.75	0.71	0.75	0.80	0.062

NSAID = nonsteroidal anti-inflammatory drug

pendence could relate to an increased use of opioids is not supported by our data.

- Pain treatment with metamizole increased from 2011 to 2016.
- Finally, the providers ordered significantly more drugs per patient over the course of this study.

#### Disclosures

No potential conflict of interest relevant to this article was reported.

#### Reference

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