The Oxford Catalogue of Opioids: A systematic synthesis of opioid drug names and their pharmacology

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Aim: The growing demand for analgesia, coupled with an increasing need to treat opioid dependence and overdose, has escalated the development of novel opioids. We aimed to quantify the number of opioid drugs developed and to catalogue them based on their pharmacology.

Methods: We conducted a systematic search of seven sources in November 2020, including the WHO’s Anatomical Therapeutic Classification index, the British National Formulary, the IUPHAR/BPS Guide to Pharmacology, the International Narcotics Control Board Index of Names of Narcotic Drugs, the WHO’s International Nonproprietary Names MedNet service, Martindale’s Extra Pharmacopoeia and the Merck Index, to include opioid drugs that targeted or had an effect or co-effect at one or more opioid receptors. We extracted chemical and nonproprietary names, drug stems, molecular formulas, molecular weights, receptor targets, actions at opioid receptors and classes based on their origins. We used descriptive statistics and calculated medians and interquartile ranges where appropriate.

Results: We identified 233 opioid drugs and created an online resource (https://www.catalogueofopioids.net/). There were 10 unique drug stems, and “-fentanil” accounted for one-fifth (20%) of all opioids. Most of the drugs (n = 133) targeted mu-opioid receptors and the majority (n = 191) were agonists at one or more receptors. Most (82%) were synthetic opioids, followed by semisynthetic opioids (16%) and alkaloids (3%).

Conclusion: This catalogue centralizes and disseminates information that could assist researchers, prescribers and the public to improve the safe use of opioids.

KEYWORDS
catalogue of drugs, drug indexes, drug lists, narcotics, opiates, opioids

1 INTRODUCTION

In most high-income countries, prescribing of opioids has increased,1-3 with corresponding increases in opioid dependence, addiction and overdose.4-5 The growing demand for analgesia, coupled with the need to treat and manage opioid dependence and overdose, has incentivized the development of new and potentially less addictive formulations of opioids and alternatives.6-8 Some estimate that...
thousands of opioids have been synthesized and investigated for their various analgesic, antidiarrheal, antitussive and dependence-producing properties, but the number of opioids is unknown and there is no central repository that comprehensively catalogues their names, types and pharmacological effects.

The increased use and development of opioids may not be reflected in the confidence of prescribers or the knowledge of the public. Studies in primary care have shown that providers often report inadequate training of opioid prescribing for chronic noncancer pain. Others have found that poor public knowledge of opioids is a barrier in observational research and may drive over- and under-reporting of opioid use and misuse. How a drug is named and classified determines how it is used, and thus misnaming a drug or a lack of knowledge of such names can cause confusion. A catalogue of opioid drug names and their pharmacology could help bridge the public’s knowledge gap, aid prescribers when choosing an opioid and centralize information for those developing the next generation of opioids and their alternatives.

### Table 1: A brief timeline of selected drug nomenclatures, classification systems and indexes

| Year   | Event                                                                 |
|--------|----------------------------------------------------------------------|
| 1618   | London Pharmacopoeia first published                                 |
| 1820   | United States Pharmacopoeia first published                          |
| 1864   | British Pharmacopoeia first published (merging the London, Edinburgh and Dublin Pharmacopoeias) |
| 1883   | Martindale’s Extra Pharmacopoeia first published                     |
| 1886   | Japanese Pharmacopoeia first published                               |
| 1889   | The Merck Index first published                                      |
| 1907   | British Pharmaceutical Codex first published                         |
| 1919   | IUPAC established                                                    |
| 1949   | The BNF first published                                              |
| 1951   | The International Pharmacopoeia first published                      |
| 1953   | The first list of INNs for pharmaceutical substances published and becomes operational |
|        | The Pharmacopoeia of the People’s Republic of China first published  |
|        | The BAN system created                                               |
| 1961   | USAN council began                                                   |
| 1969   | European Pharmacopoeia first published                               |
| 1977   | WHO publishes the first model list of essential medicines             |
| 1981   | The ATC/DDD index recommended by WHO as the international standard for drug utilization studies |
| 1996   | Dictionary of pharmacological agents first published                 |
| 1999   | Concise dictionary of pharmacological agents first published         |
| 2003   | IUPHAR & BPS develop the Guide to PHARMACOLOGY                       |

Several organizations and authorities have developed systems to name, classify and index drugs (see Table 1). City pharmacopoeias were the first to standardize and publish drug names, typically with information on available formulations that included opium. These were unified into national pharmacopoeias, such as the British Pharmacopoeia, followed by national formularies, such as the British National Formulary (BNF), and international pharmacopoeias. Drug nomenclature systems followed, including chemical names (eg, the International Union of Pure and Applied Chemistry [IUPAC] names), nonproprietary or generic names (eg, International Nonproprietary Names [INNs]) and manufacturers’ proprietary or brand names. Drug indexes and classification systems followed, including the World Health Organization (WHO) Anatomical Therapeutic Classification (ATC) index and the International Union of Basic and Clinical Pharmacology/British Pharmacological Society (IUPHAR/BPS) Guide to Pharmacology.

The ubiquitous use and increased development of opioids, and the volume of naming and classification systems, highlight the need for a centralized resource. The aim of this study was therefore to systematically search relevant databases, to quantify the number of opioid drugs developed, to create a robust list of opioid drug names and to catalogue the opioids based on their pharmacological properties.

## 2 METHODS

We designed and conducted a systematic synthesis of online pharmacology databases and used pharmacological onomastics. The study involved three phases, as displayed in Figure 1: development of the list of opioid drugs, cataloguing the drugs based on their pharmacology and development of an online resource. Here we focus on phases one and two.
2.1 | Search strategy and eligibility criteria

Two study authors independently searched seven data sources across two time periods, first in January 2019 (GCR & JKA) and again in November 2020 (GCR & KS). The seven sources were the WHO’s ATC index,16 the BNF,17 the IUPHAR/BPS Guide to Pharmacology,18 the International Narcotics Control Board (INCB) Index of Names of Narcotic Drugs,19 the WHO’s MedNet service for INNs,20 Martindale’s Extra Pharmacopoeia21 and the Merck Index.22 We used “opioid”, “opiate” and “narcotic” as search terms, as well as stems of common opioids to identify derivatives such as “-fentanyl” and “-orphine”. We included opioids if they were defined as medicaments and targeted or had an effect or coeffect at one or more opioid receptors, including mu (MOP), delta (DOP), or kappa (KOP) receptors, or the nociceptin receptor (NOP). We excluded medicaments that did not have an IUPAC name. Endogenous opioids or opioids that were metabolites, peptides, intermediates or analogues, or raw opioid-related materials were also excluded from the list unless they were synthesized as medicaments. During the second search (GCR and KS) we consulted an experienced clinical pharmacologist (JKA) when the eligibility criteria for inclusion or exclusion were unclear.

2.2 | Phase 1: List of opioid drugs

Following each of the searches, one study author (GCR) combined the lists of opioids, compared the included drugs, and removed duplicates. We did not perform a formal systematic search of databases containing published literature (eg, MEDLINE) and the wider web. However, from reading reviews and studies on opioid pharmacology and searching the web to confirm the opioid status of drugs for inclusion, we identified and added novel opioids to the list from the second search (GCR and KS) we consulted an experienced clinical pharmacologist (JKA) when the eligibility criteria for inclusion or exclusion were unclear.

2.3 | Phase two: The cataloguing of opioids by pharmacological properties

One study author (KS) extracted pharmacological data into a Google Sheet for each opioid in the list, including the molecular formula, molecular weight (g/mol), receptor targets (ie, MOP, DOP, KOP or NOP), actions at opioid receptors (ie, agonist, partial agonist and antagonist, or mixed), and class based on their origin of discovery or development (ie, alkaloids, semisynthetic or synthetic). Each drug name was searched for in PubChem, the IUPHAR/BPS Guide to Pharmacology, the published literature (via PubMed) and Google when necessary to extract the pharmacological data for phase two. Descriptive statistics were used, and medians and IQRs were calculated where appropriate. We used WIX.com to create the website that hosts the database.

We have not included inverse agonism, since the phenomenon often depends on the effect of an opioid on receptors in different states. Neutral antagonists and weak partial agonists can act as inverse agonists after treatment with an agonist.26 For example, naloxone can act as an inverse agonist after treatment with morphine27; in vitro, GSK1521498 behaves as an inverse agonist when the MOP receptor is overexpressed, but behaves as an antagonist at low receptor levels.28

2.4 | Statistical software and open science practices

We registered our study protocol on the Open Science Framework (OSF),30 and share all data, code and figures openly at GitHub,31 which is also shared openly via our OSF project page.32 We used pandas,33 seaborn34 and matplotlib35 modules in Jupyter Notebooks, with Python v3 for analysis and to create figures.

2.5 | Nomenclature of targets and ligands

Key protein targets and ligands in this article are hyperlinked to corresponding entries in http://www.guidetopharmacology.org, the common portal for data from the IUPHAR/BPS guide to PHARMACOLOGY, and are permanently archived in the Concise Guide to PHARMACOLOGY.29
3 | RESULTS

We identified 233 unique opioids from seven data sources, the literature and Wikipedia (Figure 2). The WHO MedNet database of INNs contained the most (73%), followed by the INCB report (52%), the Merck Index (47%), Martindale (29%), the Guide to Pharmacology (28%), the ATC index (24%) and the BNF (13%) (Figure A1). The sources contained a median of 68 opioids (IQR 61-115) and each drug was identified in a median of two data sources (IQR 1 to 4 sources). There were 10 unique drug stems, “-fentanil” (20%) being the most common (Table 2 and Figure A2). All drugs had an IUPAC name and 27% of drugs did not have an INN. The complete list of 233 drugs in the Oxford Catalogue of Opioids, their chemical names and the data sources in which the drugs were identified are presented in Table A1.

3.1 | Cataloguing opioids by their pharmacological properties

The opioids had a median molecular weight of 348 g/mol (IQR 299-393). There was a large amount of missing data for the receptor targets and the effects at opioid receptors (Table 3). Most drugs

![FIGURE 2](image)

**FIGURE 2**  Flow diagram of the searches conducted in phase one to identify drugs for inclusion in the Oxford Catalogue of Opioids

**TABLE 2**  The 10 stems of the drugs in the Oxford Catalogue of Opioids according to the WHO’s Stem Book 2018

| WHO stem* | Description | Frequency (%) | Examples |
|-----------|-------------|---------------|----------|
| -adol or -adol- | Analgesics | 25 (10.7) | Acetylmethadol |
| -azocine | Narcotic antagonists/agonists related to 6,7-benzomorphan | 18 (7.7) | Anazocine |
| -eridine | Pethidine derivatives | 12 (5.2) | Carperidine |
| -ethidine | Pethidine and derivatives | 4 (1.7) | Benzethidine |
| -fentanil** | Opioid receptor agonists, analgesics, fentanyl derivatives | 47 (20.2) | Alfentanil |
| nal- or -nal- | Opioid receptor antagonists/agonists related to normorphine | 14 (6.0) | Methylnaltrexone |
| -orphan/ol | Opioid receptor antagonists/agonists, morphinan derivatives | 13 (5.6) | Butorphanol |
| -orphine | Opioid receptor antagonists/agonists, morphinan derivatives | 20 (8.6) | Acetorphine |
| -orphinol | Opioid receptor antagonists/agonists, morphinan derivatives | 1 (0.4) | Hydromorphinol |
| -orphone | Opioid receptor antagonists/agonists, morphinan derivatives | 5 (2.1) | Oxymorphone |
| No stems | … | 74 (31.8) | Alphaprodine; clonitazene |

*Since compiling this table we identified an 11th stem, -opran (e.g., axelopran).
**The stem -fentanil includes novel analogues which do not have INNs.
Table 3: Opioid receptor targets and their effects at opioid receptors for the 233 drugs in the Oxford Catalogue of Opioids

| Receptors | N (%) | Agonist | Partial agonist | Antagonist | Mixed | Total |
|-----------|-------|---------|----------------|------------|-------|-------|
| MOP       | 140 (60) | 103     | 8              | 18         | 4     | 133   |
| DOP       | 84 (36)  | 40      | 3              | 16         | 1     | 60    |
| KOP       | 84 (36)  | 45      | 8              | 15         | 1     | 69    |
| NOP       | 10 (4)   | 3       | 1              | -          | -     | 4     |
| Total     | 191 (82) | 20 (8.6)| 49 (21)        | 6 (3)      |       | 233   |

*Available data for all 233 opioids.

*Some drugs affect more than one receptor, hence total is greater than 233.

Abbreviations: DOP, delta-opioid; KOP, kappa-opioid; NOP, nociception; MOP, mu-opioid.

4 | DISCUSSION

We identified 233 unique opioid drugs from seven sources and created an online resource at https://www.catalogueofopioids.net/. There were variations in the numbers of opioids identified from each source; the WHO’s MedNet service of INNs included the most drugs and the BNF the fewest. This variation can be attributed to the type and purpose of each source. There were 10 unique drug stems, one-fifth representing “-fentanyl”. Most drugs targeting MOP receptors were agonists at one or more receptors and were synthetic opioids. Further research will expand the development of the catalogue and create a visual platform that will aid prescribers and inform patients, carers and other members of the public about the properties and safety of opioids.

A review of opioid pharmacology in 1983 estimated that thousands of opioids have been synthesized and investigated for their various properties. Previous research synthesized information about opioids included in national Essential Medicines Lists using the ATC index, which found 33 unique opioid drugs. However, it was not clear how many opioids existed, nor was there a centralized repository of information that combined the various naming and classification systems. To the best of our knowledge, this is the first study to systematically determine the number of available opioid medications and to assess opioid nomenclature and pharmacology. We used systematic methods to search a variety of sources, conducted in duplicate. We named opioids using nonproprietary drug names (eg, INNs where possible), which have more therapeutic utility and reduce the risk of medication errors.

Despite using systematic methods, it is possible that there are other opioids that we have not identified from our search owing to reporting biases. Various limitations, such as spelling variants, look-alike and sound-alike names, the use of different nomenclatures for a single drug, drug abbreviations and the implications of chemical salts, were considered throughout the study, but may have resulted in opioids being omitted. There was a large volume of missing data for receptor targets and effects at receptors. We used manual methods to search the seven sources, and despite updating the search, methods will need to be developed to automatically and efficiently update the catalogue to reflect discoveries and progress in opioid pharmacology.

Inconsistent drug names can put patients and the public at risk of harms, and can affect the ability and quality of evidence synthesis and knowledge generation. While there are national and international standards for drug nomenclature, and authorities and organizations (eg, IUPAC and the WHO) and regulatory bodies to approve such names, all opioids identified in our study may not have been through such processes, owing to either their maturity or their infancy. For example, morphine was first marketed by Merck in 1827, long before drug nomenclature standards existed, and various novel opioids are being identified on the black market, such as the rise in fentanyl analogues.

A consolidated list of opioids could therefore harmonize discrepancies and standardize nomenclature, which has been found to reduce confusion, medication errors and unwarranted variation, as well as improve medication knowledge, adherence, training and communication.

Poor knowledge of opioid drugs is a significant barrier to assessing metrics of opioid use and misuse. This list of opioids and the cataloguing of drugs based on their pharmacology could assist opioid researchers, drug developers, prescribers and the public. A centralized list of opioid drugs could be used in evidence synthesis and observational research to streamline the identification of studies or prescribing data. For systematic reviews, the list of opioids could be used to create a list of opioid search terms that includes chemical, proprietary and nonproprietary drug names. For drug utilization studies, the 233 opioids could be used to design product code lists for databases, such as the Clinical Practice Research Datalink (CPRD). Regulators and pharmaceutical companies could use the list to assist generating names for new opioids. The catalogue could assist drug developers by elucidating the heterogeneous nature of opioids, helping to create comparisons of existing opioids and providing a single repository of information to develop less addictive opioids.

At present (December 2020), the website disseminates the list of drugs and their pharmacology in a searchable database. Future research will be required to develop the catalogue and create methods that automatically and efficiently update the list of opioid drugs. Patient and public involvement and engagement (PPIE) with key stakeholders (eg, patients and prescribers) will be needed to
ensure that the catalogue meets the needs of the target audiences and is useful in improving knowledge and training of prescribers and promoting the safe use of opioids. Maintaining and developing the catalogue will be a continuous process and we shall welcome feedback or contributions as it evolves.

4.1 | Conclusions

The Oxford Catalogue of Opioids (https://www.catalogueofopioids.net/) includes 233 unique opioid drugs and collates their nomenclature and pharmacological properties. Consistent nomenclature is essential for improving the safety and communication of medicines between patients, prescribers, manufactures, regulators and researchers. Future research will expand the catalogue to create a visual platform that will assist prescribers, researchers and regulators, and improve knowledge about opioids and their safe use.

ACKNOWLEDGEMENT

No funding was provided or obtained for this study.

CONTRIBUTORS

G.C.R. and J.K.A. devised the idea for this research and independently ran the initial search for opioids. G.C.R. designed the study protocol and search strategy. K.S. contributed to the study protocol, pre-registered the protocol, updated the search in seven databases and extracted the pharmacological data. J.K.A. and C.H. provided supervisory support. G.C.R. wrote the manuscript, and all authors contributed, edited and agreed to submit for publication.

COMPETING INTERESTS

G.C.R. is financially supported by the National Institute of Health Research (NIHR) School for Primary Care Research (SPCR), the Naji Foundation and the Rotary Foundation to study for a Doctor of Philosophy. K.S. has nothing to declare. C.H. is an NIHR Senior Support. G.C.R. designed the study protocol and search strategy. K.S. contributed to the study protocol, pre-registered the protocol, updated the search in seven databases and extracted the pharmacological data. J.K.A. and C.H. provided supervisory support. G.C.R. wrote the manuscript, and all authors contributed, edited and agreed to submit for publication.

DATA AVAILABILITY STATEMENT

All data, statistical code and study materials related to this research are openly available on our OSF project page (https://osf.io/2ph6c/) at Github (https://github.com/georgiarichards/CatalogueofOpioids) and are available at our online resource (https://www.catalogueofopioids.net/).

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### TABLE A1
The 233 drugs of the Oxford Catalogue of Opioids in alphabetical order, with their chemical (IUPAC) names and the databases in which the names were found

| Index name | IUPAC | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|------------|-------|-----|-----|------|-------|-------------|------|-------|-------|
| 3-methylfentanyl | n-[3-methyl-1-{2-phenylethyl} piperidin-4-yl]-n-phenylpropanamide | ● | | | | | | 1 | |
| 3-methylthiofentanyl | n-[3-methyl-1-{2-thiophen-2-ylethyl} piperidin-4-yl]-n-phenylpropanamide | ● | | | | | | 1 | |
| 4-chloroisobutyrfentanyl | 2-methyl-n-{4-chlorophenyl}-n-{1-[1-phenylpropan-2-yl] piperidin-4-yl} propenamide | 0 (1) | | | | | | | |
| 4-fluoroisobutyrfentanyl | n-{4-fluorophenyl}-{2-methyl-n-{1-[2-phenylethyl] piperidin-4-yl} propenamide | ● | | | | | | 1 | |
| 4-phenylfentanyl | n-phenyl-n-{4-phenyl-1-{2-phenylethyl} piperidin-4-yl} propenamide | 0 (2) | | | | | | | |
| 6’-guanidinonal trindole | 2-{[1s,2s,13r,21r]-22-{cyclopropylmethyl}-1,2,16-dihydroxy-14-oxa-11,22-diazaheptacyclo [13.9.1.01,13.02,21.04,12.05,10.019,25] pentacosa-4(12),5(10)6,8,15,17,19(25)-heptaen-8-yl} guanidine | 0 (3) | | | | | | | |
| 7-benzylidenenaltrexone | (4R,4aS,6E,7aR,12bS)-6-benzylidene-3-{cyclopropylmethyl}-4a,9-dihydroxy-1,2,4,5,7a,13-hexahydro-4,12-methanobenzo[furo[3,2-e]isoquinolin-7-yl] | ● | | | | | | 1 | |
| Acetorphine* | [(1r,2s,6r,14r,15r,19r)-19-{[2r]-2-hydroxypentan-2-yl}-15-methoxy-5-methyl-13-oxa-5-azahexacyclo [13.2.2.12,8.01,6.02,14.012,20]icosan-8(10)9,11,16-tetraen-11-yl} acetate | ● | | | | | | 1 | |
| Acetyldihydrocodeine | [(4r,4ar,7s,7ar,12bs)-9-methoxy-3-methyl-2,4,4a,5,6,7a,13-octahydro-3h-4,12-methanobenzo[furo[3,2-e]isoquinolin-7-yl] acetate | ● | ● | ● | | | 3 | | |
| Acetylfentanyl | n-phenyl-n-{1-[2-phenylethyl]piperidin-4-yl} acetamide | ● | | | | | | 1 | |
| Acetylmethadol* | [6-{4-dimethylamino}-4,4-diphenylethanal-3-yl} acetate | ● | | | | | | 2 | |
| Acyrfentanyl | n-phenyl-n-{1-[2-phenylethyl]piperidin-4-yl} Prop-2-enamide | ● | | | | | | 1 | |
| Ah-7921 | 3,4-dichloro-n-{[1-(dimethylamino) cyclohexyl] methyl} benzamide | ● | | | | | | 1 | |
| Alfentanil* | n-{1-[2-{4-ethyl-5-oxotetrazol-1-yl}ethyl]-4-(methoxymethyl) piperidin-4-yl}-n-phenylpropanamide | ● | ● | ● | ● | ● | ● | 6 | |
| Alimadrol* | 3-methoxy-3,3-diphenyl-n-prop-2-enylpropan-1-amine | INN | | | | | | 0 | |
| Alletorphine* | (1r,2s,6r,14r,15r,19r)-19-{[2r]-2-hydroxypentan-2-yl}-15-methoxy-5-prop-2-enyl-13-oxa-5-azahexacyclo | INN | | | | | | 0 | |
| Index name | IUPAC | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|------------|-------|-----|-----|------|-------|-------------|------|-------|-------|
| Allylprodine* | (1-methyl-4-phenyl-3-prop-2-enylpiperidin-4-yl) propanoate | ● | ● | | | | | 2 | |
| Alphacetylmethadol* | [(3r,6r)-6-(dimethylamino)-4,4-diphenylheptan-3-yl] acetate | ● | | | | | | 1 | |
| Alphameprodine* | [(3s,4r)-3-ethyl-1-methyl-4-phenylpiperidin-4-yl] propanoate | ● | | | | | | 1 | |
| Alphamethadol* | (3r,6r)-6-(dimethylamino)-4,4-diphenylheptan-3-ol | ● | | | | | | 1 | |
| Alphamethylacetylfentanyl | n-phenyl-n-{[1-{1-phenylpropan-2-yl}piperidin-4-yl] acetamide | ● | | | | | | 1 | |
| Alphamethylfentanyl | n-phenyl-n-{[1-{1-phenylpropan-2-yl}]-4-piperidyl) propenamide | ● | ● | | | | | 2 | |
| Alphamethylthiofentanyl | n-phenyl-n-{[1-{1-thiophen-2-yl}propan-2-yl] piperidin-4-yl] propanamide | ● | | | | | | 1 | |
| Alphamethylthiofentanyl | n-phenyl-n-{[1-{1-thiophen-2-yl}propan-2-yl]-4-piperidyl] propenamide | ● | | | | | | 1 | |
| Alphaprodine | [(3s,4r)-1,3-dimethyl-4-phenylpiperidin-4-yl] propanoate; hydrochloride | ● | ● | ● | | | | 2 | |
| Alvimopan* | 2-[[2s]-2-benzyl-3-[[3r,4r]-4-(3-hydroxyphenyl)-3,4-dimethylpiperidin-1-yl]propanoylamino] acetic acid | ● | ● | ● | ● | | 4 | |
| Anazocine* | 9-methoxy-3-methyl-9-phenyl-3-azabicyclo[3.3.1] nonane | | | | | | | 0 | INN |
| Anileridine* | Ethyl 1-[2-[4-aminophenyl]ethyl]-4-phenylpiperidine-4-carboxylate | ● | ● | ● | ● | ● | 5 | |
| Apadolinel* | n-propyl-10-[[2r]-1-pyrrolidin-1-ylpropan-2-yl]phenothiazine-2-carboxamide | | | | | | | 0 | (4) |
| Asalhydromorphone* | [4r,4a,r,7a,r,12bs]-9-{[2-acetyloxybenzoyloxy]-3-methyl-2,4,4a,5,7a,13-hexahydro-1H-4,12-methanobenzofuran [3,2-e]isoquinolin-7-yl] 2-acetyloxybenzoate | | | | | | | 0 | (5) |
| Asinadolinel* | n-[[1s]-2-[[3s]-3-hydroxypyrrolidin-1-yl]-1-phenylethyl]-n-methyl-2,2-diphenylacetamide | ● | | | | | | 2 | |
| Axomadol* | (1r,3r,6r)-6-[[dimethylamino)methyl]-1-(3-methoxyphenyl) cyclohexane-1,3-diol | | | | | | | 0 | INN |
| Benezthidine* | Ethyl 4-phenyl-1-[2-(phenmethoxyethyl)piperidin-4-carboxylate | | | | | | | 1 | |
| Benezhydrocodone | [[4r,4a,r,7a,r,12bs]-9-methoxy-3-methyl-2,4,4a,5,7a,13-hexahydro-1H-4,12-methanobenzofuran [3,2-e]isoquinolin-7-yl] benzoate | | | | | | | 0 | (6-8) |
| Benzodioxolefentanyl | n-phenyl-n-{[1-{2-phenylethyl}piperidin-4-yl]-2h-1,3-benzodioxole-5-carboxamide | | | | | | | 0 | (9) |
| Benzylfentanyl | n-phenyl-n-{[1-{2-phenylethyl}piperidin-4-yl] benzamide | | | | | | | 0 | (10) |
| Benzylfentanyl | n-{1-benzylpiperidin-4-yl}-n-phenylpropanamide | | | | | | | 0 | (11) |

(Continues)
| Index name     | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|---------------|-----------------------------------------------------------------------|-----|-----|------|-------|-------------|------|-------|-------|
| Benzylmorphine| (4r,4a,7r,7a,12bs)-3-methyl-9-phenylmethoxy-2,4,4a,7,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin-7-ol | ●   | ●   |      |       |             |      |       |       |
| Betacetylmethadol* | [[3s,6r)-6-(dihydroxyheptan-3-yl)acetate |      |     |      |       |             |      | 1     |       |
| Betahydroxyfentanyl | n-[1-(2-hydroxy-2-phenylethyl)piperidin-4-yl]-n-phenylpropanamide | ●   |     |      |       |             |      |       |       |
| Betahydroxythiofentanyl | n-[1-(2-hydroxy-2-thiophen-2-yl)ethyl]piperidin-4-yl]-n-phenylpropanamide | 0   |     |      |       |             |      | (12)  |       |
| Betameprodine* | (3-ethyl-1-methyl-4-phenyl)piperidin-4-yl propanoate                  | ●   |     |      |       |             |      | 1     |       |
| Betamethadol* | (3s,6r)-6-(dihydroxyheptan-3-ol |      |     |      |       |             |      | 1     |       |
| Betamethylfentanyl | n-phenyl-n-[1-(2-phenylpropyl)piperidin-4-yl] propenamide | 0   |     |      |       |             |      | (13)  |       |
| Betaprodine* | [[3r,4r]-1,3-dimethyl-4-phenyl]piperidin-4-yl propanoate |     |     |      |       |             |      | 1     |       |
| Bezitramide* | 4-[4-(2-oxo-3-propanoylbenzimidazol-1-yl)piperidin-1-yl]-2,2-diphenylbutanenitrile | ●   | ●   | ●    | ●    | ●           |      | 4     |       |
| Bremazocine* | (1s,9r)-1-ethyl-10-[[1-hydroxy-cyclopropyl]methyl]-13,13-dimethyl-10-azatricyclo[7.3.0.0\(2\),10]trideca-7,9-dien-11-ol | ●   |     |      |       |             |      | 1     |       |
| Brifentanil* | n-[[3r,4s]-1-[2-(4-ethyl-5-oxotetrazol-1-yl)ethyl]-3-methyl]piperidin-4-yl]-n-[2-fluorophenyl]-2-methoxycetamide | 0   |     |      |       |             |      | INN   |       |
| Bromadoline* | 4-bromo-n-[[1s,2s]-2-(dihydroxyheptan-3-yl)benzamide |     |     |      |       |             |      | (14)  |       |
| Brophine | 1-[1-[1-(4-bromophenylethyl)piperidin-4-yl]-1,3-dihydro-2h-benzimidazol-2-one | 0   |     |      |       |             |      | (15)  |       |
| Bu-08028 | (1s,2s,6r,14r,15r,16r)-5-(cyclopropylmethyl)-16-[[2s]-2-hydroxy-3,3-dimethylpentan-2-yl]-15-methoxy-13-oxa-5-azahexacyclo[13.2.2.0\(1,2\),9,11]trideca-2(7),3,5-trien-11-ol | ●   |     |      |       |             |      | 1     | (16)  |
| Buprenorphine* | (1s,2s,6r,14r,15r,16r)-5-(cyclopropylmethyl)-16-[[2s]-2-hydroxy-3,3-dimethylbutan-2-yl]-15-methoxy-13-oxa-5-azahexacyclo[13.2.2.0\(1,2\),9,11]trideca-2(7),3,5-trien-11-ol | ●   | ●   | ●    | ●    | ●           |      | 5     |       |
| Butinazocine* | 10-but-3-ynyl-13,13-dimethyl-10-azatricyclo[7.3.1.0\(2\),7]trideca-2(7),3,5-trien-1,4-diol | 0   |     |      |       |             |      | INN   |       |
| Butorphanol* | (1s,9r,10a)-17-(cyclobutylmethyl)-17-azatetraacyclo[7.5.3.0\(1,2\),7]heptadeca-2(7),3,5-trien-4,10-diol | ●   | ●   | ●    | ●    | ●           |      | 4     |       |
| Butyrfentanyl | n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl]butanamide |     |     |      |       |             |      | 1     |       |
| Carbazocine | 20-(cyclopropylmethyl)-3,20-diazapentacyclo[10.5.3.0\(1,13\),0\(2\),10,0\(4\)]trideca-2(10),4,6,8-tetraene | 0   |     |      |       |             |      | INN   |       |
| Index name       | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|-----------------|-----------------------------------------------------------------------|-----|-----|------|-------|------------|------|-------|-------|
| Carfentanil*    | Methyl 1-(2-phenylethyl)-4-(n-propanoylanilino) piperidine-4-carboxylate | ●   | ●   | ●    | ●     | ●          |      | 3     |       |
| Carperidine*    | Ethyl 1-(3-amino-3-oxopropyl)-4-phenylpiperidine-4-carboxylate         |     |     |      |       |            | INN  | 0     |       |
| Ciramadol*      | 3-[(r)-dimethylamino-[(1,2r)-2-hydroxycyclohexyl]methyl] phenol         | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Clonitazene*    | 2-[(1,2r)-4-chlorophenyl]methyl]-5-nitrobenzimidazol-1-yl]-n,n-dietylethenamine |     |     |      |       |            | INN  | 3     |       |
| Codeine         | (4r,4a,7,7a,12b)-9-methoxy-3-methyl-2,4a,7,7a,13-hexahydro-1h-4,12-methanobenzo[3,2-e]isoquinolin-7-ol | ●   | ●   | ●    | ●     | ●          |      | 6     |       |
| Codoxime*       | 2-[(4r,4a,7,7ar,12b)-9-methoxy-3-methyl-1,2,4a,5,6,7a,13-octahydro-4,12-methanobenzo[3,2-e]isoquinolin-7-ylidene] amino] oxacetic acid | ●   |     |      |       |            |      | 1     |       |
| Cogazocine      | 10-(cyclobutylmethyl)-1-ethyl-13,13-dimethyl-10-azatricyclo[7.3.1.02,7]trideca-2(7),3.5-trien-4-ol |     |     |      |       |            |      | 0     | (17)  |
| Crotonylfentanyl| (2e)-n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl]but-2-enameide         | ●   |     |      |       |            | INN  | 1     |       |
| Cyclazocine*    | 10-(cyclopropylmethyl)-1,13-dimethyl-10-azatricyclo[7.3.1.02,7]trideca-2(7),3.5-trien-4-ol | ●   |     |      |       |            | INN  | 2     |       |
| Cyclopentylfentanyl| n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl] cyclopropanecarboxamide   |     |     |      |       |            |      | 0     | (18)  |
| Cyclopropylfentanyl| n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl] cyclopropanecarboxamide | ●   |     |      |       |            | INN  | 1     |       |
| Cymprenorphine* | [1r,2s,6r,14r,15r,19r]-5-(cyclopropyl)methyl]-19-[2-hydroxypropan-2-yl]-15-methoxy-13-oxa-5-azahexacyclo[13.2.2.12,8.01,6.02,7.012,20]icosa-8(2019.11,16-tetraen-11-ol | ●   |     |      |       |            | INN  | 1     |       |
| Desmethymoramide*| 4-morpholin-4-yl-2,2-diphenyl-1-pyrrolidin-1-ylbutan-1-one             |     |     |      |       |            | INN  | 0     |       |
| Desmethylprodine| (1-methyl-4-phenylpiperidin-4-yl) propanoate                           | ●   |     |      |       |            |      | 1     |       |
| Desmetramadol*  | 3-[(r,2r)-2-[(dimethylamino)methyl]-1-hydroxycyclohexyl] phenol        |     |     |      |       |            |      | 0     | (19)  |
| Desomorphine*   | (4r,4a,7,7a,12b)-3-methyl-2,4a,5,6,7,7a,13-octahydro-1h-4,12-methanobenzo[3,2-e]isoquinolin-9-ol | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Dextromethorphan*| (1s,9,10s)-4-methoxy-17-methyl-17-azatetracyclo[7.5.3.01,10.02,7]heptadeca-2(7),3.5-triene | ●   | ●   | ●    | ●     | ●          |      | 5     |       |
| Dextromoramide* | (3s)-3-methyl-4-morpholin-4-yl-2,2-diphenyl-1-pyrrolidin-1-ylbutan-1-one | ●   | ●   | ●    | ●     | ●          |      | 5     |       |
| Index name       | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|------------------|------------------------------------------------------------------------|-----|-----|------|-------|------------|------|-------|-------|
| Dextropropoxyphene* | [2s,3r]-4-(dimethylamino)-3-methyl-1,2-diphenylbutan-2-yl propanoate   | ●   | ●   | ●    | ●     | ●          |      | 4     |       |
| Dezocine*         | (1r,9s,15a)-15-amino-1-methyltricyclo [7.5.1.02,7]pentadeca-2(7),3,5-trien-4-ol | ●   | ●   | ●    | ●     | ●          |      | 3     |       |
| Diamorphine       | [4r,4ar,7s,7a,12bs]-9-acehtoxy-3-methyl-2,4,4a,7,7a,13-hexahydro-1h-4,12-methanobenzofuro [3,2-e]isoquinolin-7-yl acetate | ●   | ●   | ●    | ●     | ●          | ●   | 6     |       |
| Diampromide*      | n-[2-{methyl-(2-phenylethyl)amino}propyl]-n-phenylpropanamide         | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Dibenzoylmorphine | (9-benzoyloxy-3-methyl-2,4,4a,7,7a,13-hexahydro-1h-4,12-methanobenzofuro [3,2-e]isoquinolin-7-yl benzoate |      |      |      |       |            |      | 0     | (20)  |
| Difenoxin*        | 1-(3-cyano-3,3-diphenylpropyl)-4-phenylpiperidine-4-carboxylic acid    |      |      |      |       |            |      | 1     |       |
| Dihydrocodeine*   | (4r,4ar,7s,7ar,12bs)-9-methoxy-3-methyl-2,4,4a,5,6,7a,13-octahydro-1h-4,12-methanobenzofuro [3,2-e]isoquinolin-7-ol | ●   | ●   | ●    | ●     | ●          |      | 5     |       |
| Dihydroetorphine  | (1s,6r,14r,15r,16r)-16-[(2r)-2-hydroxypentan-2-yl]-15-methoxy-5-methyl-13-oxa-5-azahexacyclo [13.2.2.12,8.01,6.02,14.012,20]icosao-8(20),9.11-trien-11-ol |      |      |      |       |            |      | 1     |       |
| Dihydromorphine   | (4r,4ar,7s,7ar,12bs)-3-methyl-2,4,4a,5,6,7a,13-octahydro-1h-4,12-methanobenzofuro [3,2-e]isoquinoline-7,9-diol | ●   | ●   | ●    | ●     | ●          |      | 3     |       |
| Dimemorfan*       | (1s,9s,10s)-4,17-dimethyl-17-azatetryclo[7.5.3.01,10.02,7]heptadeca-2(7),3,5-triene | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Dimenoxadol*      | 2-(dimethylamino)ethy1-2-ethoxy-2,2-diphenylacetate                   | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Dimepheptanol*    | 6-(dimethylamino)-4,4-diphenylheptan-3-ol                             | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Dimethylthiambutene* | n,n-dimethyl-4,4-dithiophen-2-y1 but-3-en-2-amine                     | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Dinalbuphine sebacate* | Bis[(4r,4as,7s,7ar,12bs)-3-(cyclobutylmethyl)-4a,7-dihydroxy-1,2,4,5,6,7,7a,13-octahydro-4,12-methanobenzofuro [3,2-e]isoquinolin-9-yl] decanedioate |      |      |      |       |            |      | 0     | (21,22) |
| Dioxaphetyl butyrate* | Ethyl 4-morpholin-4-yl-2,2-diphenylbutanoate                        | ●   | ●   | ●    | ●     | ●          |      | 2     |       |
| Diphenoxylate*    | Ethyl 1-(3-cyano-3,3-diphenylpropyl)-4-phenylpiperidine-4-carboxylate | ●   | ●   | ●    | ●     | ●          |      | 6     |       |
| Dipipanone*       | 4,4-diphenyl-6-piperidin-1-ylheptan-3-one                             | ●   | ●   | ●    | ●     | ●          |      | 5     |       |
| Diprenorphine*    | (1s,6r,14r,15r,16r)-5-(cyclopropylmethyl)-16-(2-hydroxypropan-2-yl)-15-methoxy-13-oxa-5-azahexacyclo [13.2.2.12,8.01,6.02,14.012,20]icosao-8(20),9.11-trien-11-ol | ●   | ●   | ●    | ●     | ●          |      | 3     |       |
| Index name | IUPAC | ATC | BNF | Merck | Martindale | GtoP | Total | Other |
|------------|-------|-----|-----|-------|------------|------|-------|-------|
| Drotebanol* | (1r,9r,10s,13r)-3,4-dimethoxy-17-methyl-17-azatetracyclo[9.5.3.01,10.02,7]heptadeca-2(7),3,5-triene-10,13-diol | [7] | [3] | [3] | [3] | [3] | [3] | [3] |
| Eluxadoline* | 5-[(2s)-2-amino-3-[4-carbamoyl-2,6-dimethylphenyl]propanoyl]-[(1s)-1-(5-phenyl-1h-imidazol-2-yl)ethyl]amino]-2-methoxybenzoic acid | [9] | [3] | [3] | [3] | [3] | [3] | [3] |
| Embutramide* | n-[2-ethyl-2-(3-methoxyphenyl)butyl]-4-hydroxybutanamide | [13] | [3] | [3] | [3] | [3] | [3] | [3] |
| Enadoline* | 2-(1-benzofuran-4-yl)-n-methyl-n-[1-(5r,7 s,8 s)-7-pyrrolidin-1-yl-1-oxaspiro[4.5]decan-8-yl]acetamide | [13] | [3] | [3] | [3] | [3] | [3] | [3] |
| Eptazocine* | (1s,9s)-1,11-dimethyl-11-azatricyclo[7.4.1.02,7]tetradeca-2(7),3,5-trien-4-ol | [17] | [3] | [3] | [3] | [3] | [3] | [3] |
| Ethoheptazine | Ethyl 1-methyl-4-phenylazepane-4-carboxylate | [19] | [3] | [3] | [3] | [3] | [3] | [3] |
| Ethylmethylthiambutene* | n-ethyl-n-methyl-4,4-dithiophen-2-ylbut-3-en-2-amine | [20] | [3] | [3] | [3] | [3] | [3] | [3] |
| Ethylmorphine | (4r,4ar,7s,7ar,12bs)-9-ethoxy-3-methyl-2,4,4a,7,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin-7-ol | [21] | [3] | [3] | [3] | [3] | [3] | [3] |
| Etonitazene* | 2-[2-[(4-ethoxyphenyl)methyl]-5-nitrobenzimidazol-1-yl]-n,n-diethylethanamine | [24] | [3] | [3] | [3] | [3] | [3] | [3] |
| Etorphine* | (1r,2s,6r)-19-(2-hydroxypentan-2-yl)-15-methoxy-5-methyl-13-oxa-5-azahexacyclo[13.2.2.12,8.01,6.02,14.012,20]icosa-8(20),9,11,16-tetraen-11-ol | [26] | [3] | [3] | [3] | [3] | [3] | [3] |
| Etoxeridine* | Ethyl 1-[2-(2-hydroxyethoxy)ethyl]-4-phenylpiperidine-4-carboxylate | [29] | [3] | [3] | [3] | [3] | [3] | [3] |
| Fedotozine | (2r)-n,n-dimethyl-2-phenyl-1-(3,4,5-trimethoxyphenyl)methoxy]butan-2-amine | [32] | [3] | [3] | [3] | [3] | [3] | [3] |
| Fentanyl* | n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl] propanamide | [34] | [3] | [3] | [3] | [3] | [3] | [3] |
| Fluradoline* | 2-(3-fluorobenzo[b]benzoxepin-5-yl)sulfanyl-n-methylethanamine | [39] | [3] | [3] | [3] | [3] | [3] | [3] |
| Furanylfentanyl | n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl]furan-2-carboxamide | [41] | [3] | [3] | [3] | [3] | [3] | [3] |
| Furethidine* | Ethyl 1-[2-(oxolan-2-ylmethoxy)ethyl]-4-phenylpiperidine-4-carboxylate | [44] | [3] | [3] | [3] | [3] | [3] | [3] |
| Gemazocine* | 10-(cyclopropylmethyl)-1-ethyl-13,13-dimethyl-10-azatetracyclo[9.5.3.01,10.02,7]heptadeca-2(7),3,5-triene-10,13-diol | [45] | [3] | [3] | [3] | [3] | [3] | [3] |
| Hamperorphone* | 2-[(2-carboxyethoxy)methyl]ethyl-4-phenylpiperidine-4-carboxylate | [46] | [3] | [3] | [3] | [3] | [3] | [3] |
| Index name        | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|------------------|------------------------------------------------------------------------|-----|-----|------|-------|------------|------|-------|-------|
| Hydrocodone*     | (4r,4a,7r,12bs)-9-methoxy-3-methyl-1,2,4,4a,5,6,7a,13-octahydro-4,12-methanobenzofuro [3,2-e]isoquinolin-7-one | ●   | ●   | ●    | ●     | ●          | ●   | 5     |       |
| Hydromorphinol*  | (4r,4a,7s,7r,12bs)-3-methyl-12,4,5,6,7a,13-octahydro-4,12-methanobenzofuro [3,2-e] isoquinoline-4a,7,9-triol | ●   | ●   | ●    | ●     | ●          | ●   | 1     |       |
| Hydromorphone*   | (4r,4a,7r,12bs)-9-hydroxy-3-methyl-1,2,4,4a,5,6,7a,13-octahydro-4,12-methanobenzofuro [3,2-e] isoquinolin-7-one | ●   | ●   | ●    | ●     | ●          | ●   | 6     |       |
| Hydroxypethidine*| Ethyl 4-(3-hydroxyphenyl)-1-methylpiperidine-4-carboxylate              | ●   | ●   | ●    | ●     | ●          | ●   | 2     |       |
| Ibucin*          | 1,13,13-trimethyl-10-(3-methylbut-2-yl)-10-azatricyclo[7.3.1.02,7]trideca-2(7),3,5-trien-4-ol | 0   | INN |      |       |            |      |       |       |
| Ici-174 864      | (25)-2-[[25]-2-[[25]-2-lis (prop-2-enyl)amino]-3-(4-hydroxyphenyl)propanoylamino]-2-methylpropanoylamino]-3-phenypropanoylamino]-4-methylpentanoic acid | ●   |     |      |       |            | 1   |       |       |
| Isobutyylfentanyl| 2-methyl-n-phenyl-n-[1-(2-phenethyl)-4-piperidyl]-propenamide            | 0   | (25)|      |       |            |      |       |       |
| Isofentanyl      | n-[1-benzyl-3-methylpiperidin-4-yl]-n-[1-(2-phenethyl)-4-piperidyl]-propenamide | 0   | Wiki|      |       |            |      |       |       |
| Isomethadone*    | 6-(dimethylamino)-5-methyl-4,4-diphenylhexan-3-one                        | ●   | ●   | ●    | ●     | ●          | ●   | 2     |       |
| Ketazocine*      | (1r,9s,13r)-10-(cyclopropylmethyl)-4-hydroxy-1,13-dimethyl-10-azatricyclo[7.3.1.02,7]trideca-2(7),3,5-trien-8-one | 0   | (27)|      |       |            |      |       |       |
| Ketobemidone*    | 1-(4-(3-hydroxyphenyl)-1-methylpiperidin-4-yl)propan-1-one               | ●   | ●   | ●    | ●     | ●          | ●   | 4     |       |
| Kethorfanol*     | (1s,9r,10r)-17-(cyclopropylmethyl)-3-hydroxy-17-azatetracyclo[7.5.3.01,10,02,7]heptadeca-2(7),3,5-trien-13-one | 1   | INN |      |       |            |      |       |       |
| Lefetamine*      | 1R)-N,N-dimethyl-1,2-diphenylethanamine                                 | ●   |     |      |       |            | 1   | (28)  |       |
| Levacetylmethadol*| [(3s,6a)-6-(dimethylamino)-4,4-diphenyheptan-3-yl] acetate              | ●   | ●   | ●    | ●     | ●          | ●   | 4     |       |
| Levallorphan*    | (1r,9r,10r)-17-prop-2-enyl-17-azatetracyclo[7.5.3.01,10,02,7]heptadeca-2(7),3,5-trien-4-ol | ●   | ●   | ●    | ●     | ●          | ●   | 3     |       |
| Levomethadone*   | (6r)-6-(dimethylamino)-4,4-diphenyheptan-3-one                          | ●   |     |      |       |            | 3   |       |       |
| Levomethorphan*  | (1r,9r,10r)-4-methoxy-17-methyl-17-azatetracyclo[7.5.3.01,10,02,7]heptadeca-2(7),3,5-triene | ●   | ●   | ●    | ●     | ●          | ●   | 2     |       |
| Levomoramide*    | (3r)-3-methyl-4-morpholin-4-yl-2,2-diphenyl-1-pyrrolidin-1-ylbutan-1-one| ●   |     |      |       |            | 1   |       |       |
| Levophenacylmorphan*| 2-(1r,9r,10r)-4-hydroxy-17-azatetracyclo[7.5.3.01,10,02,7]heptadeca-2(7),3,5-trien-17-yl]-1-phenylethanone | ●   |     |      |       |            | 1   |       |       |
| Levopharnol*     |                                                                      | ●   | ●   | ●    | ●     | ●          | ●   | 4     |       |
| Index name       | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|-----------------|------------------------------------------------------------------------|-----|-----|------|-------|-------------|------|-------|-------|
| Lofentanil*     | (3r,4s)-3-methyl-1-(2-phenylethyl)-4-n-propanoylanilino)piperidine-4-carboxylate |     |     |      |       |             |      |       |       |
| Loperamide*     | 4-[4-(4-chlorophenyl)-4-hydroxyperidin-1-yl]-n,n-dimethyl-2,2-diphenylbutanamide |     |     |      |       |             |      |       |       |
| Meptazinol*     | 3-(3-ethyl-1-methylazepan-3-yl)phenol                                 |     |     |      |       |             |      |       |       |
| Metazocine*     | 1,10,13-trimethyl-10-azatricyclo[7.3.1.02,7]trideca-2(7),3,5-trien-4-ol |     |     |      |       |             |      |       |       |
| Metethoheptazine* | Ethyl 1,3-dimethyl-4-phenylazepane-4-carboxylate        | 0   | INN |      |       |             |      |       |       |
| Methadone*      | 6-(dimethylamino)-4,4-diphenylethyl-3-one                            |     |     |      |       |             |      |       |       |
| Methamphetamine* | Methyl 1,2-dimethyl-4-phenylazepane-4-carboxylate               | 0   | INN |      |       |             |      |       |       |
| Methoxyacetylendanyl | 2-methoxy-n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl] acetamide |     |     |      |       |             |      |       |       |
| Methyldesorphone* | (4r,4a,7a,12bs)-3,7-dimethyl-2,4,4a,5,7a,13-hexahydro-1h-4,12-methanbenzofurino[3,2-e]isoquinolin-9-ol |     |     |      |       |             |      |       |       |
| Methylhydromorphone* | (4r,4a,7a,12bs)-3,7-dimethyl-1,2,4,4a,5,6,7a,13-hexahydro-4,12-methanbenzofuro[3,2-e]isoquinolin-7,9-diol |     |     |      |       |             |      |       |       |
| Methylnaloxone* | (4r,4a,7a,12bs)-3-(cyclopropylmethyl)-4a,9-dihydroxy-3-methyl-2,4,5,6,7a,13-hexahydro-1h-4,12-methanbenzofuro[3,2-e]isoquinolin-3-um-7-one |     |     |      |       |             |      |       |       |
| Metopon*        | (4r,4a,7a,12bs)-2,4,4a,5,6,13-hexahydro-1h-4,12-methanbenzofuro[3,2-e]isoquinolin-7,one |     |     |      |       |             |      |       |       |
| Mirfentanil*    | n-[1-(2-phenylethyl)piperidin-4-yl]-n-pyrazin-2-ylfuran-2-carboxamide | 0   | (29) |      |       |             |      |       |       |
| Morpheridine*   | Ethyl 1-(2-morpholin-4-ylethyl)-4-phenyiperidine-4-carboxylate       |     |     |      |       |             |      |       |       |
| Morphine*       | (4r,4a,7a,12bs)-3-methyl-2,4,4a,7a,13-hexahydro-1h-4,12-methanbenzofuro[3,2-e]isoquinolin-7,9-diol |     |     |      |       |             |      |       |       |
| Moxazocine*     | [1s,9,13r]-(cyclopropylmethyl)-13-methoxy-1-methyl-10-azatricyclo[7.3.1.02,7]trideca-2(7),3,5-trien-4-ol | 0   | (30) |      |       |             |      |       |       |
| Mt-45           | 1-cyclohexyl-4-(1,2-diphenylethyl)piperazine                          |     |     |      |       |             |      |       |       |
| Myrophenine*    | [(4r,4a,7a,12bs)-3-methyl-9-phenylmethoxy-2,4,4a,7a,13-hexahydro-1h-4,12-methanbenzofuro[3,2-e]isoquinolin-7,yl] tetradecanoate |     |     |      |       |             |      |       |       |

(Continues)
| Index name                  | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|----------------------------|------------------------------------------------------------------------|-----|-----|------|-------|-------------|------|-------|-------|
| n-methylnorcarfentanil     | Methyl 1-methyl-4-(n-phenylpropanamido)piperidine-4-carboxylate       |     |     |      |       |             |      | 0     | Wiki  |
| Nalbuphine*                | (4r,4a,7s,7ar,12bs)-3-(cyclobutylmethyl)-1,2,4,5,6,7,7a,13-octahydro-4,12-methanobenzofuro[3,2-e]isoquinoline-4a,7,9-triol | ●   | ●   | ●    | ●     | ●           | ●    | 5     |       |
| Naldemedine*               | (4r,4a,7s,7ar,12bs)-3-(cyclopropylmethyl)-4a,7,9-trihydroxy-n-[(2-[3-phenyl]-1,2,4-oxadiazol-5-yl]propan-2-yl]-1,2,4,5,7a,13-hexahydro-4,12-methanobenzofuro[3,2-e]isoquinoline-6-carboxamide |     |     |      |       |             | ●    | 5     |       |
| Nalfurafine*               | (e)-n-(4r,4a,7s,7ar,12bs)-3-(cyclopropylmethyl)-4a,9-dihydroxy-1,2,4,5,6,7,7a,13-octahydro-4,12-methanobenzofuro[3,2-e]isoquinolin-7-yl]-3-(furan-3-yl)-n-methylprop-2-enamide | ●   | ●   | ●    | ●     | ●           | ●    | 3     |       |
| Nalmefene*                 | (4r,4a,7s,7as,12bs)-3-(cyclopropylmethyl)-7-methylidene-2,4,5,6,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinoline-4a,9-diol |     |     |      |       |             | ●    | 5     |       |
| Nalmexone*                 | (4r,4a,7s,7ar,12bs)-4a,9-dihydroxy-3-(3-methylbut-2-enyl)-2,4,5,6,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin-7-one |     |     |      |       |             |     | 0     | (31)  |
| Nalorphine*                | (4r,4a,7s,7ar,12bs)-3-prop-2-enyl-2,4,4a,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinoline-7,9-diol | ●   | ●   | ●    | ●     | ●           | ●    | 4     |       |
| Naloxegol*                 | (4r,4a,7s,7ar,12bs)-7-[2-[2-[2-[2-[2-[2-[2-(2-methoxyethoxy)ethoxy]ethoxy]ethoxy]ethoxy]ethoxy]ethoxy]-3-prop-2-enyl-1,2,4,5,6,7a,13-octahydro-4,12-methanobenzofuro[3,2-e]isoquinoline-4a,9-diol |     |     |      |       |             | ●    | 5     |       |
| Naloxone*                  | (4r,4a,7s,7ar,12bs)-4a,9-dihydroxy-3-prop-2-enyl-2,4,5,6,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin-7-one | ●   | ●   | ●    | ●     | ●           | ●    | 5     |       |
| Naltrexone*                | (4r,4a,7s,7ar,12bs)-3-(cyclopropylmethyl)-4a,9-dihydroxy-2,4,5,6,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin-7-one | ●   | ●   | ●    | ●     | ●           | ●    | 4     |       |
| Naltiben                   | (15,25,13R,21R)-22-(cyclopropylmethyl)-11,14-dioxaocta-22-azahexacyclo[13.9.1.01,13.02,21.04,12.05,10.019,25]pentacosa-4(12),5,7,9,15,17,19(25)-heptaene-2,16-diol | ●   | ●   | ●    | ●     | ●           | ●    | 1     |       |
| Naltrindole                | (15,25,13R,21R)-22-(cyclopropylmethyl)-14-oxa-11,22-diazaheptacyclo[13.9.1.01,13.02,21.04,12.05,10.019,25]pentacosa-4(12),5,7,9,15,17,19(25)-heptaene-2,16-diol | ●   | ●   | ●    | ●     | ●           | ●    | 1     |       |
| Narceine                   | 6-[2-[2-[2-(dimethylamino)ethyl]-4-methoxy-1,3-benzodioxol-5-y]acetetyl]-2,3-dimethoxybenzoic acid |     |     |      |       |             | ●    | 2     |       |
| Index name          | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|---------------------|------------------------------------------------------------------------|-----|-----|------|-------|------------|------|-------|-------|
| Nexeridine*         | [1-[1-(dimethylamino)propan-2-yl]-2-phenylcyclohexyl] acetate          |     |     |      |       |            |      | 0     | INN   |
| Nicocodine*         | [(4r,4ar,7,7ar,12bs)-9-methoxy-3-methyl-2,4,4a,7,7a,13-hexahydro-1h-4,12-methanobenzofuro [3,2-e] isoquinolin-7-yl] pyridine-3-carboxylate |     |     |      |       |            |      | 2     |       |
| Nicodidocine*       | [(4r,4ar,7,7ar,12bs)-9-methoxy-3-methyl-2,4,4a,5,6,7a,13-octahydro-1h-4,12-methanobenzofuro [3,2-e] isoquinolin-7-yl] pyridine-3-carboxylate |     |     |      |       |            |      | 1     |       |
| Nicomorphine*       | [(4r,4ar,7,7ar,12bs)-3-methyl-9-(pyridine-3-carbonyloxy)-2,4,4a,7,7a,13-hexahydro-1h-4,12-methanobenzofuro [3,2-e] isoquinolin-7-yl] pyridine-3-carboxylate |     |     |      |       |            |      | 4     |       |
| Noracymethadol*     | [6-(methylamino)-4,4-diphenylethtan-3-yl] acetate                      |     |     |      |       |            |      | 2     |       |
| Norcodeine*         | (4r,4ar,7,7ar,12bs)-9-methoxy-1,2,3,4,4a,7,7a,13-octahydro-4,12-methanobenzofuro [3,2-e] isoquinolin-7-ol |     |     |      |       |            |      | 2     |       |
| Norlevorphanol*     | 17-azatetraacyclo[7.5.3.0,1.10,02,7] heptadeca-2(7),3,5-trien-4-ol    |     |     |      |       |            |      | 2     |       |
| Normethadone*       | 6-(dimethylamino)-4,4-diphenylethcan-3-one                             |     |     |      |       |            |      | 3     |       |
| Normorphine*        | (4r,4ar,7,7ar,12bs)-1,2,3,4,4a,7,7a,13-octahydro-4,12-methanobenzofuro [3,2-e] isoquinoline-7,9-diol |     |     |      |       |            |      | 3     |       |
| Norpipanone*        | 4,4-diphenyl-6-piperidin-1-yhexan-3-one                                |     |     |      |       |            |      | 2     |       |
| Noscapine*          | (3s)-6,7-dimethoxy-3-{[(5r)-4-methoxy-6-methyl-7,8-dihydro-5h-[1,3]dioxolo[4,5-g]isoquinolin-5-yl]-3h-2-benzofuran-1-one} |     |     |      |       |            |      | 4     |       |
| Ocfentanil*         | n-[2-fluorophenyl]-2-methoxy-n-[1-(2-phenylethyl)piperidin-4-yl] acetamide |     |     |      |       |            |      | 1     |       |
| Ohmefentanyl        | n-[1-(2-hydroxy-2-phenylethyl)-3-methylpiperidin-4-yl]-n-phenylpropanamide |     |     |      |       |            |      | 1     |       |
| Oliceridine*        | n-[3-methoxythiophen-2-ylmethyl]-2-[(9r)-9-pyridin-2-yl-6-oxaspiro[4,5]decan-9-yl] ethanamine |     |     |      |       |            |      | 1     | (32) |
| Oripavine           | (4r,7ar,12bs)-7-methoxy-3-methyl-2,4,7a,13-tetrahydro-1h-4,12-methanobenzofuro [3,2-e] isoquinolin-9-ol |     |     |      |       |            |      | 3     |       |
| Orthofluorofentanyl | n-[2-fluorophenyl]-n-[1-(2-phenylethyl)piperidin-4-yl] propanamide       |     |     |      |       |            |      | 1     |       |
| Oxilorphan*         | (1s,9r,10s)-17-(cyclopropylmethyl)-17-azatetraacyclo[7.5.3.0,1.10,02,7] heptadeca-2(7),3,5-trien-4,10-diol |     |     |      |       |            |      | 0     | (33,34) |
| Oxpheneridine*      | Ethyl 1-[2-hydroxy-2-phenylethyl]-4-phenylpiperidine-4-carboxylate      |     |     |      |       |            |      | 0     | (35)  | 

(Continues)
| Index name                  | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|----------------------------|----------------------------------------------------------------------|-----|-----|------|-------|-------------|------|-------|-------|
| Oxycodone*                 | (4r,4a,7ar,12bs)-4a-hydroxy-9-methoxy-3-methyl-2,4,5,6,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e] isoquinolin-7-one | ●   | ●   | ●    | ●     | ●           | ●    | 6     |       |
| Oxymorphone*               | (4r,4a,7ar,12bs)-4a,9-dihydroxy-3-methyl-2,4,5,6,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e] isoquinolin-7-one | ●   | ●   | ●    | ●     | ●           | ●    | 4     |       |
| Papaveretum                | (4r,4a,7s,12bs)-9-methoxy-3-methyl-2,4,4a,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e] isoquinolin-7-ol | ●   | ●   | ●    | ●     | ●           | ●    | 4     |       |
| Parafluorobutyrylfentanyl | n-(4-fluorophenyl)-n-[1-(2-phenylethyl)piperidin-4-yl] butanamide       | ●   |     |      |       |             | ●    | 1     |       |
| Parafluorofentanyl        | n-(4-fluorophenyl)-n-[1-(2-phenylethyl)piperidin-4-yl] propanamide      | ●   |     |      |       |             | ●    | 1     |       |
| Pentamorphone*            | (4r,4a,7ar,12br)-9-hydroxy-3-methyl-4a-(pentylamino)-2,4,7a,13-tetrahydro-1h-4,12-methanobenzofuro[3,2-e] isoquinolin-7-one | ●   |     |      |       | ●           | ●    | 1     |       |
| Pentazocine*              | (1r,9r,13r)-1,13-dimethyl-10-(3-methylbut-2-ethyl)-10-azatricyclo[7.3.1.02,7]trideca-2(7),3,5-trien-4-ol | ●   | ●   | ●    | ●     | ●           | ●    | 5     |       |
| Pepap                     | [4-phenyl-1-(2-phenylethyl)piperidin-4-yl] acetate                     | ●   |     |      |       |             | ●    | 1     |       |
| Pethidine*                | Ethyl 1-methyl-4-phenylpiperidine-4-carboxylate                       | ●   | ●   | ●    | ●     | ●           | ●    | 6     |       |
| Phenadoxone*              | 6-morpholin-4-yl-4,4-diphenylheptan-3-one                             | ●   |     |      |       |             | ●    | 2     |       |
| Phenampramidone*          | n-phenyl-n-[1-piperidin-1-ylpropan-2-y1] propenamide                  | ●   | ●   | ●    | ●     | ●           | ●    | 2     |       |
| Phenazocine*              | 1,13-dimethyl-10-(2-phenylethyl)-10-azatricyclo[7.3.1.02,7] trideca-2(7),3,5-trien-4-ol | ●   |     |      |       | ●           | ●    | 4     |       |
| Pheneridine*              | Ethyl 4-phenyl-1-(2-phenylethyl)piperidine-4-carboxylate               | ●   |     |      |       | ●           | ●    | 0 INN |       |
| Phenomorphan*             | (1r,9r,10r)-17-(2-phenylethyl)-17-azatetraacyclo[7.5.3.01,10.02,7]heptadeca-2(7),3,5-trien-4-ol | ●   | ●   | ●    |       | ●           | ●    | 2     |       |
| Phenoperidine*            | Ethyl 1-(3-hydroxy-3-phenylpropyl)-4-phenylpiperidine-4-carboxylate    | ●   | ●   | ●    |       | ●           | ●    | 4     |       |
| Pholcodine*               | (4r,4a,7ar,12bs)-3-methyl-9-(2-morpholin-4-y1ethoxy)-2,4,4a,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e] isoquinolin-7-ol | ●   | ●   | ●    | ●     | ●           | ●    | 5     |       |
| Picenadol*                | 3-{(3r,4s)-1,3-dimethyl-4-propylpiperidin-4-yl} phenol                 | ●   |     |      |       |             | ●    | 1     |       |
| Piminodine*               | Ethyl 1-(3-anilinopropyl)-4-phenylpiperidine-4-carboxylate             | ●   | ●   | ●    |       | ●           | ●    | 2     |       |
| Pinadoline*               | 3-chloro-n'-(5-chloropentanoyl)-6h-benzo[b][1,4]benzoxazepine-5-carboxyhydrazide | ●   |     |      |       |             | ●    | 0 INN |       |
| Index name* | IUPAC                                                                                     | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|-----------|-------------------------------------------------------------------------------------------|-----|-----|------|-------|-------------|------|-------|-------|
| Piratramide* | 1-(3-cyano-3,3-diphenylpropyl)-4-piperidin-1-ylpiperidine-4-carboxamide                   | ●   | ●   | ●    | ●    |             | ●   | 4     |       |
| Prodine    | (13.-dimethyl-4-phenylpiperidin-4-yl) propanoate                                         | ●   |     |      |       |             | ●   |       | (36)  |
| Proheptazine* | (1,3-dimethyl-4-phenylazepin-4-yl) propanoate                                           | ●   |     |      |       |             | ●   | 2     |       |
| Properidine* | Propan-2-yl 1-methyl-4-phenylpiperidine-4-carboxylate                                   | ●   |     |      |       |             | ●   | 1     |       |
| Propiram*  | n-(1-piperidin-1-ylpropan-2-yl)-n-pyrindin-2-ylpropanamide                             | ●   |     | ●    | ●    | ●           |     | 3     |       |
| Proxorphan* | (1s,9r,10r)-17-(cyclopropylmethyl)-13-oxa-17-azatetracyclo[7.5.3.01,10.02,7]heptadeca-2(7),3,5-trien-4-ol | ●   |     |      |       |             |     | 0     | (37)  |
| Quadazocine* | 1-cyclopentyl-5-[1(1s,9r)-4-hydroxy-1,10,13-trimethyl-10-azatricyclo[7.3.1.02,7]trideca-2(7),3,5-trien-13-yl]pentan-3-one | ●   |     |      |       |             |     | 1     |       |
| r-30 490   | n-[4-(methoxymethyl)-1-1-(2-phenylethyl)piperidin-4-yl]-n-phenylpropanamide            | ●   |     |      |       |             |     | 0     | (38)  |
| Remifentanil* | Methyl 1-(3-methoxy-3-oxopropyl)-4-(n-propanoylanilino)piperidine-4-carboxylate       | ●   |     | ●    | ●    | ●           |     | 6     |       |
| Sameridine* | n-ethyl-1-hexyl-n-methyl-4-phenylpiperidin-4-carboxamide                                | ●   |     |      |       |             |     | 0     | (39)  |
| Semorphone* | (4r,4a,7ar,12bs)-4a,9-dihydroxy-3-(2-methoxyethyl)-2,4,5,6,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin-7-one | ●   |     |      |       |             |     | 0     | (40)  |
| Spiradoline* | 2-(3,4-dichlorophenyl)n-methyl-n-[5r,7s,8s]-7-pyrroolidin-1-yl-1-oxaspiro[4,5]decan-8-ylacetamide | ●   |     |      |       |             |     | 2     |       |
| Sufentanil* | n-[4-(methoxymethyl)-1-(2-thiophen-2-ylethyl)piperidin-4-yl]-n-phenylpropanamide     | ●   |     | ●    | ●    | ●           |     | 5     |       |
| Tapentadol* | 3-[2r,3r]-1-(dimethylamino)-2-methylpentan-3-yl[phenol                                   | ●   |     | ●    | ●    | ●           |     | 5     |       |
| Tetrahydrofuranylfentanyl | n-phenyl-n-[1-(2-phenylethyl)piperidin-4-yl]oxolane-2-carboxamide | ●   |     |      |       |             |     | 1     |       |
| Tetramethylcyclopropylfentanyl | 2,2,3,3-tetramethyl-n-[1-phenethylpiperidin-4-yl]-n-phenylcyclopropane-1-carboxamide | ●   |     |      |       |             |     | 0     | (41)  |
| Thebacon*  | [(4r,4ar,7ar,12bs)-9-methoxy-3-methyl-2,4,4a,5,7a,13-hexahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin-7-yl]acetate | ●   |     |      |       |             |     | 3     |       |
| Thebaine    | (4r,7ar,12bs)-7,9-dimethoxy-3-methyl-2,4,7a,13-tetrahydro-1h-4,12-methanobenzofuro[3,2-e]isoquinolin | ●   |     |      |       |             |     | 2     |       |
| Thiafentanil | Methyl 4-n-[2-methoxyacetylanilino]-1-(2-thiophen-2-ylethyl)piperidin-4-carboxylate | ●   |     |      |       |             |     | 0     | (42)  |
| Thiopentanyl | n-phenyl-n-[1-(2-thiophen-2-ylethyl)piperidin-4-yl]propanamide                       | ●   |     |      |       |             |     | 1     |       |
| Index name | IUPAC                                                                 | BNF | ATC | INCB | Merck | Martindale | GtoP | Total | Other |
|------------|-----------------------------------------------------------------------|-----|-----|------|-------|-------------|------|-------|-------|
| Tianeptine*| 7-[(3-chloro-6-methyl-5,5-dioxa-11 h-benzo[c][2,1]benzothiazepin-11-yl)amino]heptanoic acid | ●   |     |      |       |             |      | 1     | (43)  |
| Tilidine*  | Ethyl (1s,2r)-2-(dimethylamino)-1-phenylcyclohex-3-ene-1-carboxylate | ●   | ●   | ●    | ●    |             |      | 4     |       |
| Tipp-psi   | (2S)-2-[[2S]-2-[[2S]-2-[[2S]-2-amino-3-{4-hydroxyphenyl}propanoyl]-3.4-dihydro-1H-isooquinol-3-yl]methylamino]-3-phenyl(propanoyl)amino]-3-phenylpropanoic acid | ●   |     |      |       |             |      | 1     |       |
| Tonazocine*| 1-[[1r,9s,13d]-4-hydroxy-1,10,13-trimethyl-10-azatricyclo[7.3.1.02,7]trideca-2(7),3,5-trien-13-yl]octan-3-one | 0   |     | INN  |       |             |      | (44)  |       |
| Tramadol*  | (1r,2r)-2-[(dimethylamino)methyl]-1-(3-methoxyphenyl) cyclohexan-1-ol | ●   | ●   | ●    | ●    | ●           |      | 5     |       |
| Trefentanil*| n-[1-2-[4-ethyl-5-oxotetrazol-1-yl]ethyl]-4-phenylpiperidin-4-yl]-n-[2-fluorophenyl]propanamide | ●   |     |      |       |             |      | 1     |       |
| Trimebutine*| [2-(dimethylamino)-2-phenylbutyl] 3,4,5-trimethoxybenzoate | ●   |     |      |       |             |      | 2     |       |
| Trimeperidine* | (12.5,5-trimethyl-4-phenylpiperidin-4-yl) propanoate | ●   |     |      |       |             |      | 3     |       |
| u-47 700   | 3,4-dichloro-n-[2-(dimethylamino)cyclohexyl]-n-methylbenzamide | ●   |     |      |       |             |      | 1     |       |
| Valencyfentanyl | n-phenyl-n-[1-[2-phenylethyl]piperidin-4-yl] pentanamide | ●   |     |      |       |             |      | 1     |       |
| Veradoline* | 4-[2-(6,7-dimethoxy-1-methyl-3,4-dihydro-1h-isooquinolin-2-yl) ethyl]aniline | 0   |     | INN  |       |             |      |       |       |
| Volazocine*| 10-(cyclopropylmethyl)-1,13-dimethyl-10-azatricyclo[7.3.1.02,7]trideca-2,4,6,triene | 0   |     |      |       |             |      | (45)  |       |
| Xorphanol* | 1r,9r,10r,11s]-17-(cyclobutylmethyl)-11-methyl-13-methylidine-17-azatetracyclo [7.5.3.01,10,02,7] heptadeca-2(7),3,5-trien-4-ol | 0   |     |      |       |             |      | (46)  |       |

*Names identified in the INN search (n = 170); if there was no INN name, the BAN or the name reported in the BNF was selected, otherwise the next most common drug name was selected.

Abbreviations: ATC, Anatomical Therapeutic Classification; BNF, British National Formulary; GtoP, IUPHAR/BPS Guide to Pharmacology; INCB, International Narcotic Control Board; INN, International Nonproprietary Names; IUPAC, International Union of Pure and Applied Chemistry.
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FIGURE A1  The number of opioid drugs identified in the seven databases searched to create phase one of the Oxford Catalogue of Opioids

FIGURE A2  Ten stems of the drugs in the Oxford Catalogue of Opioids
hydrocodone, after intranasal administration in recreational drug users. Pain Med (United States) [Internet]. 2018[cited 2020 Nov 1];19(12):2438-2449.Available from: https://pubmed.ncbi.nlm.nih.gov/29092079/  
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