

Study of Alternative Dosage Forms for Drug Administration in Geriatric Patients

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Abstract

A documentary review was carried out on the production and publication of research papers related to the study of the variables Drug Supply and Geriatric Patients. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the period 2017-2022, achieving the identification of 21 publications in total. The information provided by this platform was organized through graphs and figures, categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics have been described, the position of different authors on the proposed topic is referenced through a qualitative analysis. Among the main findings made through this research, it is found that the United States was the country with the highest number of registrations in Scopus with a total of 8 publications referring to the study of pharmaceutical prescriptions and the different alternatives for the supply of medicine in the elderly population. The Area of Knowledge that made the greatest contribution to the study variables was Medicine with 18 published documents, and the Type of Publication that was most used during the period indicated above were Journal Articles, which represent 86% of the total scientific production.

Keywords: *Medical Formulas, Pharmaceutical Forms, Drug Supply, Geriatric Patients.*

1. Introduction

As we witness the advances present in the world's population, in order to improve medical care in geriatric patients, we seek to be able to transform and meet the unique needs of these patients and therefore address the unique challenges present in each demographic group of adults. Among the innumerable roles played by the role of health care in the geriatric factor, the proper intervention of the pharmaceutical company plays an essential role in this management, which starts with managing and improving the quality of life of these patients. Based on this premise, the compliance exercised by good management by health administrators with a focus on this patient presents a complex of considerations, which are associated with physiological changes associated with age, to the prevalence of polypharmacy and the efficiency found in excellent medication management.

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With the scope of being able to address all the challenges present in medical care, the development of alternative forms in the pharmacology sector has become the epicenter for good management where the innovation and research factor take center stage. Traditional dosage forms, such as tablets and capsules, can pose challenges for geriatric patients, including swallowing difficulties, compromised gastrointestinal function, and variations in drug absorption. When it comes to knowing the difficulties in this sector, the pharmaceutical industry, together with researchers and health professionals, actively seeks alternative formulas with which more optimal results are sought and thus optimize the results and in turn address the specific needs of this particular population.

When incorporating new alternative forms in the pharmaceutical industry, innovation is sought to cover a large part of the needs of patients, which range from new drug delivery systems to being able to adequately supply alternative dosage methods which aims to improve patient adherence and thus reduce the risk of adverse effects. It is important to address all the existing complexities in the administration of medications in geriatric patients, advances aim to revolutionize geriatric healthcare and ultimately contribute to improving the effectiveness of treatment, improving patient safety and a higher quality of life for older people.

The commitment in the development of implementing alternative pharmaceutical forms is based on being able to comprehensively address pharmacokinetic and pharmacodynamic changes, which are based on the needs associated with the aging of patients. This heterodox, such as changes in gastric pH, decreased gastric emptying, and alterations in liver and kidney function, require formulations that take into account variations in drug absorption, distribution, metabolism, and excretion. Comorbidities and polypharmacy in the geriatric population underscore the importance of developing formulations that decrease the risk of drug interactions and adverse effects.

However, in this exploration, to highlight the role played by the pharmaceutical company in being able to incorporate alternative measures for geriatric patients, it represents an effort without present, in which it seeks to close the gap between therapeutic innovation and the changing health care needs of an aging population. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables Drug Supply and Geriatric Patients, as well. Such as the description of the position of certain authors affiliated with institutions, during the period between 2017 and 2022.

2. General Objective

To analyze, from a bibliometric and bibliographic perspective, the production of research papers on the variables Drug Supply and Geriatric Patients, published in high-impact journals indexed in the Scopus database during the period 2017-2022.

3. Methodology

A quantitative analysis of the information provided by Scopus is carried out under a bibliometric approach on the scientific production related to the study of the variables Supply of Medicines and Geriatric Patients. Likewise, from a qualitative perspective, examples of some research works published in the area of study mentioned above are analyzed, from a bibliographic approach to describe the position of different authors regarding the proposed topic.

The search is carried out through the tool provided by Scopus and parameters referenced in Figure 1 are established.

3.1 Methodological design



Figure 1. Methodological design

Source: Authors.

3.1.1 Phase 1: Data collection

Data collection was carried out through the Search tool on the Scopus website, through which a total of 18 publications were identified. To this end, search filters were established consisting of:

TITLE-ABS-KEY (medication AND supply, AND geriatric AND patients) AND PUBYEAR > 2016 AND PUBYEAR < 2023

- ✓ Published documents whose study variables are related to the study of the Supply of Medicines and Geriatric Patients
- ✓ Without distinction of country of origin.
- ✓ Without distinction of area of knowledge.
- ✓ No distinction of type of publication.

3.1.2 Phase 2: Construction of analytical material

The information identified in the previous phase is organized. The classification will be made by means of graphs, figures and tables based on data provided by Scopus.

- ✓ Co-occurrence of Words.
- ✓ Year of publication
- ✓ Country of origin of the publication.
- ✓ Area of knowledge.
- ✓ Publication Type

3.1.3 Phase 3: Drafting of conclusions and outcome document

After the analysis carried out in the previous phase, we proceed to the drafting of the conclusions and preparation of the final document.

4. Results

4.1 Co-occurrence of words

Figure 2 shows the co-occurrence of keywords within the publications identified in the Scopus database.

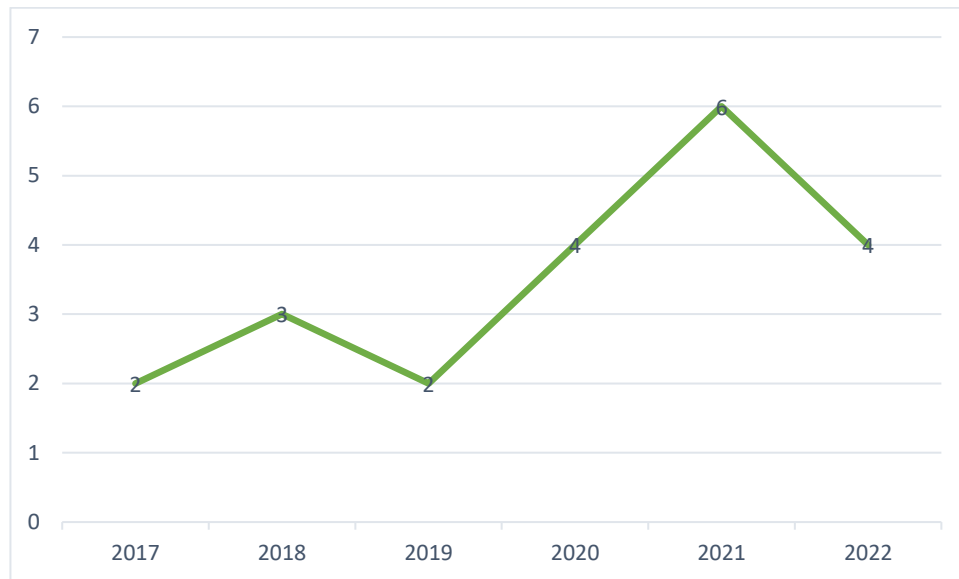


Figure 3. Distribution of scientific production by year of publication.

Source: Authors' own elaboration (2023); based on data provided by Scopus.

Among the main characteristics evidenced through the distribution of scientific production by year of publication, the number of publications registered in Scopus was in 2021, reaching a total of 6 documents published in journals indexed on this platform. This can be explained by articles such as the one titled "Medication adherence in older adults with chronic obstructive pulmonary disease enrolled in Medicare before and during the COVID-19 pandemic" This study evaluated changes in adherence to control medications and factors associated with high adherence. This retrospective cohort study included older Medicare patients with COPD. The proportion of days covered (PDC) reflected changes in medication adherence from January to July in 2019 and 2020. The paired t-test assessed changes in adherence. Logistic regression determined the association of patient characteristics with high adherence ($CDP \geq 80\%$). Mean adherence decreased ($p < 0.001$) for long-acting beta-agonists, long-acting muscarinic antagonists, and inhaled corticosteroids in 2020. The percentage of patients with high adherence decreased from 74.4% to 58.1% ($p < 0.001$). The number of controllers, who had ≥ 3 albuterol replenishments and a 90-day supply were associated with high adherence in 2019 and 2020 ($p < 0.001$). The COVID-19 pandemic may negatively impact medication adherence. Patients with evidence of more severe illness and a 90-day supply were more likely to adhere to treatment. Healthcare professionals should prioritize prescribing 90-day supplies of medication and monitor medication-related issues as components of pharmacovigilance to improve adherence to therapies and desired clinical outcomes among COPD patients. (Liu, 2022)

4.3 Distribution of scientific production by country of origin.

Figure 4 shows how all the publications registered in Scopus are distributed according to the country of origin of the institutions studied.

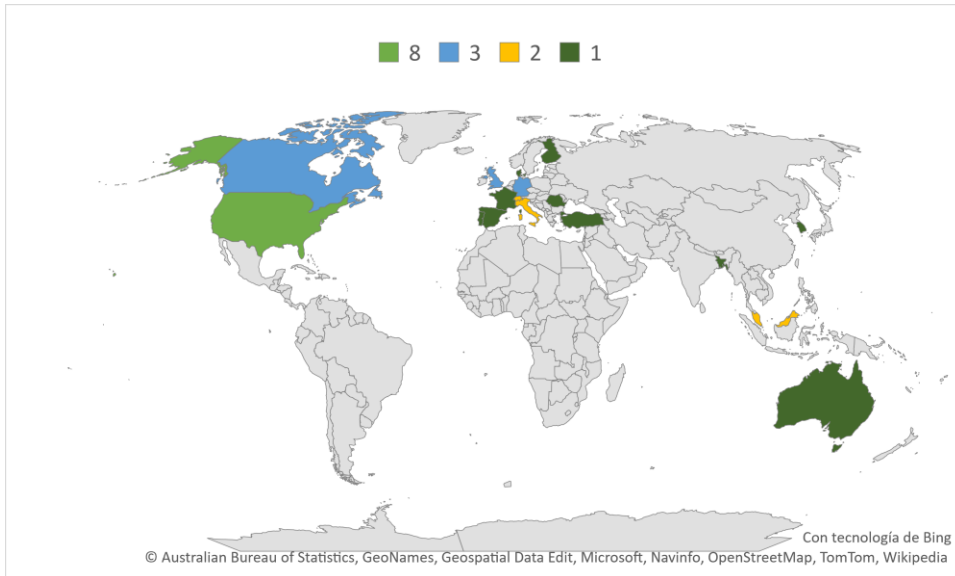


Figure 4. Distribution of scientific output by country of origin

Source: Authors' own elaboration (2023); based on data provided by Scopus

Within the distribution of scientific production by country of origin, the records from institutions were taken into account, establishing the United States as the country of this community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 8 publications in total. In second place, the United Kingdom, Canada with 3 scientific papers, and Italy occupying the third place presenting to the scientific community, with a total of 2 documents among which is the article entitled "Evaluation of a health information exchange system for geriatric health care in rural areas: development study and technical acceptance" This study aimed to develop a regional health information exchange (HIE) system to improve HIE in geriatric treatment. This study also evaluated the usability of the regional HIE system and sought to identify barriers and facilitators of its implementation. Methods: The development of the regional HIE system followed the community-based participatory research approach. The main results were the usability of the regional HIE system, the expected implementation barriers and enablers, and the quality of the development process. Data were collected and analysed using a mixed-methods approach. Results: A total of 3 focus regions were identified, 22 geriatric health care providers participated in the development of the regional HIE system, and 11 workshops were held between October 2019 and September 2020. In total, 12 participants answered a questionnaire. The main findings were that the regional HIE system should support the exchange of assessments, diagnostics, medicines, provision of assistive devices and social information. It was hoped that the regional HIE system could improve the quality and continuity of care. In total, 5 adoption facilitators were identified. The main points were the adaptability of the regional HIE system to local needs, availability for different patient groups and treatment documents, web-based design, trust between users and computer skills. (Pfeuffer, 2022)

4.4 Distribution of scientific production by area of knowledge

Figure 5 shows how the production of scientific publications is distributed according to the area of knowledge through which the different research methodologies are executed.

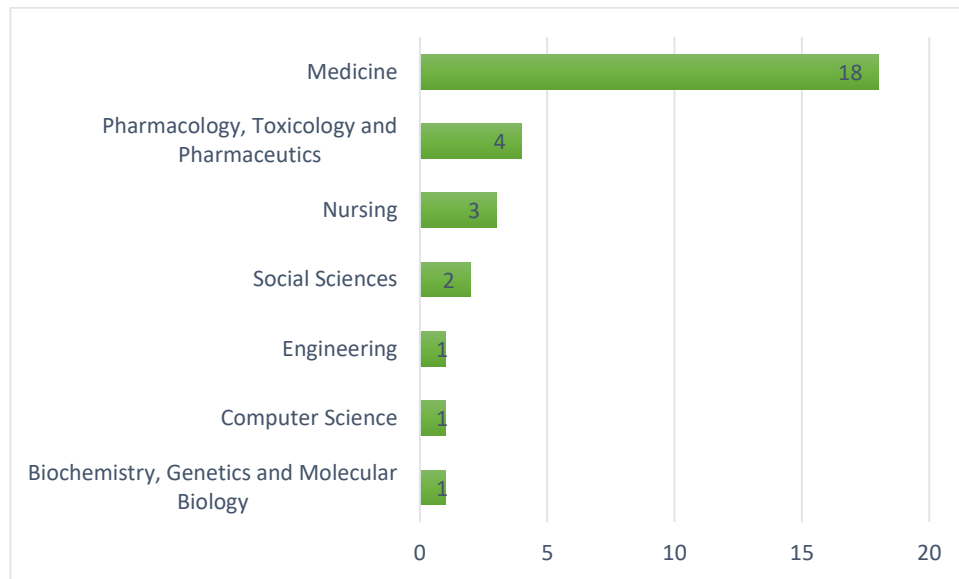


Figure 5. Distribution of scientific production by area of knowledge.

Source: Authors' own elaboration (2023); based on data provided by Scopus.

Medicine was the area of knowledge with the highest number of publications registered in Scopus with a total of 18 documents that have based its methodologies Drug Supply and Geriatric Patients. In second place, Pharmacology, Toxicology and Pharmacy with 3 articles and Nursing in third place with 3. This can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by Medicine entitled "Potentially inappropriate drug duplication in a cohort of older adults with dementia" The objective was to examine drug duplication in a cohort of older adults with dementia. Methods: Cohort entry for Nova Scotia Pharmacare for Older Persons Program recipients was the date a dementia code from the ninth or tenth edition of the International Classification of Diseases was recorded in databases accessed between March 1, 2005 and March 31, 2015. Medication dispensing and sociodemographic data were captured from the Nova Scotia Pharmacare Program for Seniors database between April 1, 2010 and March 31, 2015. Duplication was considered when 2 drugs of the same class were dispensed so that the supply in the patient's possession could overlap for more than 30 days. We report the number of duplication cases and the duration of overlap. Sex differences in drug duplication were assessed using bivariate logistic regression. (Trenaman, 2021)

4.5 Type of publication

Figure 6 shows how the bibliography is distributed according to the type of publication chosen by the authors.

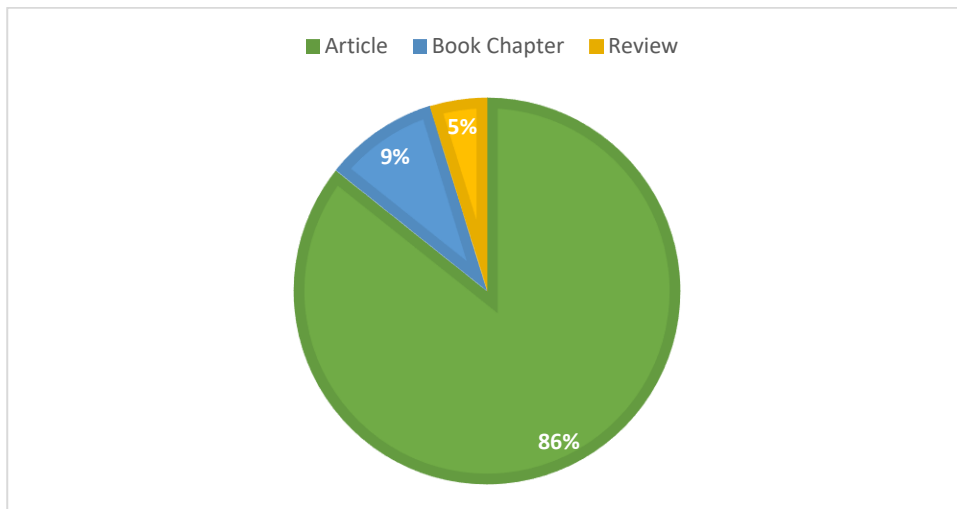


Figure 6. Publication Type

Source: Authors' own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was the one entitled Journal Articles with 86% of the total production identified for analysis, followed by Book Chapter with 9%. Journals are part of this classification, representing 5% of the research papers published during the period 2017-2022, in journals indexed in Scopus. In the latter category, the one entitled "Concurrent use of opioids with other active central nervous system drugs among older adults" stands out. The main objective was to determine the prevalence and characteristics of older adults who simultaneously use opioids and other medications active in the central nervous system (CNS), and the specialties of the providers who ordered the medications. A secondary objective was to document medication-related adverse effects associated with such concurrent drug use. Study populations were identified as adults aged ≥ 65 years and older with 1 year of continuous enrollment in a medical and drug plan during 2017 and opioid use of ≥ 2 prescriptions for a ≥ 15 -day supply. Active CNS medications included benzodiazepines, non-benzodiazepine hypnotics, muscle relaxants, antipsychotics, and gabapentinoids. Supplier specialties were identified from the National Supplier Identification database. Characteristics associated with opioids alone, opioids plus 1, and opioids plus ≥ 2 additional CNS-active drugs were determined by multinomial logistic regression. Outcome measures during 2017 included injurious falls/fractures and ≥ 3 emergency room (ER) visits. Among eligible members ($N = 209,947$), 57% used opioids alone, 28% used opioids plus 1 additional central nervous system medication, and 15% used ≥ 2 additional medications. About 60% of opioids and other concomitant CNS medications were prescribed by the same provider, usually a primary care provider. Benzodiazepines and gabapentinoids were used more frequently at the same time as opioids. Health status, insomnia, anxiety, depression, and low back pain had the strongest associations with concurrent medication use. (Musich, 2020)

5. Conclusions

Through the bibliometric analysis carried out in this research work, it was possible to establish that the United States was the country with the highest number of published records regarding the variables Supply of Medicines and Geriatric Patients. With a total of 8 publications in the Scopus database. In the same way, it was possible to establish that the application of theories framed in the area of Medicine, They were used more frequently in the exploration of new alternative methods in the dosage of medicines. difficulties associated with this minority population. Preliminary analysis of various alternative dosage forms has highlighted the potential benefits and drawbacks of each approach. Modified-

release prescriptions, transdermal patches, oral administration, and inhalation therapies offer clear advantages in improving medication adherence, reducing adverse effects, and improving overall therapeutic outcomes in geriatric patients. The nature of these new forms in the pharmacological sector results in achieving adaptability to the personal conditions of each patient and their state of health and thus ensuring the preferences of this population. The emphasis on patient-centered care emphasizes the importance of adapting drug delivery methods to accommodate commonly observed cognitive and physical limitations. Likewise, the provision of easy devices, simplified dosing control and innovative bottle designs help to contribute in a scalable way to reducing medication errors and in turn imparting greater dependence on the consumption of medicines in a timely and controlled manner to this population of older people. One of the drawbacks of this field is the constant need for researchers to continuously execute pharmaceutical development methods with the need to be able to optimize the efficiency, safety and acceptability of the different alternative methods. Bringing together pharmaceutical companies, healthcare professionals, and academic researchers is crucial to advancing the science of geriatric drug delivery. Collectively, it should focus on refining existing technologies, exploring new delivery systems, and conducting rigorous clinical trials to validate the efficacy and safety of these formulations in the elderly population. Good management in medical care is to promote a fundamental role in education, both by health professionals and patients, since they must be made aware of the benefits of new alternative forms of pharmacology. Increased awareness of these options can empower geriatric patients to actively participate in their treatment plans, fostering a sense of autonomy and control over their health.

References

- Amores Leime, C. A., & Pérez Rodríguez, G. P. (2017). Ethnicity and access to health services: A case of Ecuadorian indigenous and Afro-descendants in the period 2006-2015. *Publishing*, 618-638.
- National AssemblyEcuador. (2016). [registrocivil.gob.ec](https://www.registrocivil.gob.ec/content/uploads/downloads/2018/03/ley_organica_de_gestion_de_la_identidad_y_datos_civiles.pdf). Retrieved from https://www.registrocivil.gob.ec/wp-content/uploads/downloads/2018/03/ley_organica_de_gestion_de_la_identidad_y_datos_civiles.pdf
- Coale, A., & Demeny, P. (1983). *Model regional life tables and stable populations*. N. Jersey: Princeton University Press.
- INEC. (2012). *Population projections of the Republic of Ecuador 2010 - 2050*. Ecuador.
- INEC. (May 2016). *Mortality tables, methodology*. Spain.
- National Institute of Statistics and Census (INEC). (May 2020). *National Institute of Statistics and Census (INEC)*. Retrieved from https://public.tableau.com/app/profile/instituto.nacional.de.estad.stica.y.censos.inec/viz/Registroestadsticodedefuncionesgenerales_15907230182570/Men
- Liu, L. A. (2022). Medication adherence in older adults with chronic obstructive pulmonary disease enrolled in Medicare before and during the COVID-19 pandemic. UNITED STATES.
- Musich, S. W. (2020). Concurrent use of opioids with other active central nervous system medications among older adults. UNITED STATES.
- United Nations. (2014). United Nations. Retrieved from <https://www.un.org/es/global-issues/population>
- United Nations. (2014). *unstats.un.org*. Retrieved from https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles_and_Recommendations/CRVS/M19Rev3-S.pdf
- PAHO. (2017). *Basic guidelines for mortality analysis*.
- Pfeuffer, N. B. (2022). Evaluation of a Health Information Exchange System for Geriatric Health Care in Rural Areas: Development Study and Technical Acceptance. GERMANY.

- Trenaman, S. C. (2021). Potentially inappropriate drug duplication in a cohort of older adults with dementia. CANADA.
- Alrafiaah, A. S., Alqarny, M. H., Alkubedan, H. Y., AlQueflie, S., & Omair, A. (2017). Are the saudi parents aware of antibiotic role in upper respiratory tract infections in children? *Journal of Infection and Public Health*, 10(5), 579-585. doi:10.1016/j.jiph.2017.01.023
- Alshogran, O. Y., Alzoubi, K. H., Khabour, O. F., & Farah, S. (2018). Patterns of self-medication among medical and nonmedical university students in jordan. *Risk Management and Healthcare Policy*, 11, 169-176. doi:10.2147/RMHP.S170181
- Ambrosy, A. P., Malik, U. I., Thomas, R. C., Parikh, R. V., Tan, T. C., Goh, C. H., . . . Go, A. S. (2021). Rationale and design of the pragmatic randomized trial of icosapent ethyl for high cardiovascular risk adults (MITIGATE). *American Heart Journal*, 235, 54-64. doi:10.1016/j.ahj.2021.01.018
- Angor, M., & Nawasreh, A. O. (2022). Effect of lockdown in the COVID-19 pandemic on dietary habits and self-medication practice in people living in jordan. *International Journal of Nutrition, Pharmacology, Neurological Diseases*, 12(4), 263-268. doi:10.4103/ijnpnd.ijnpnd_50_22
- Araluce, E. A. (2021). Pharmaceutical dispensing in bizkaia during the spanish flu pandemic. [Farmazi dispentsazioa Bizkaian espainiar gripearen pandemian] *Gaceta Médica de Bilbao*, 118, S41-S48. Retrieved from www.scopus.com
- Araújo, M. G., Magalhães, G. M., Garcia, L. C., Vieira, É. C., Carvalho-Leite, M. D. L. R. D., & Guedes, A. C. M. (2021). Update on human papillomavirus – part II: Complementary diagnosis, treatment and prophylaxis. *Anais Brasileiros de Dermatologia*, 96(2), 125-138. doi:10.1016/j.abd.2020.11.005
- Arvikar, S. L., Crowley, J. T., Sulka, K. B., & Steere, A. C. (2017). Autoimmune arthritides, rheumatoid arthritis, psoriatic arthritis, or peripheral spondyloarthritis following lyme disease. *Arthritis and Rheumatology*, 69(1), 194-202. doi:10.1002/art.39866
- Ashraf, S., Ashraf, S., Ashraf, M., Imran, M. A., Choudhary, Z. A., Hafsa, H. T., . . . Izhar, M. (2022). Knowledge, attitude, and practice of clinicians about antimicrobial stewardship and resistance among hospitals of pakistan: A multicenter cross-sectional study. *Environmental Science and Pollution Research*, 29(6), 8382-8392. doi:10.1007/s11356-021-16178-2
- Aslam, A., Zin, C. S., Jamshed, S., Ab Rahman, N. S., Ahmed, S. I., Pallós, P., & Gajdács, M. (2022). Self-medication with antibiotics: Prevalence, practices and related factors among the pakistani public. *Antibiotics*, 11(6) doi:10.3390/antibiotics11060795
- Au Yeung, V., Thapa, K., Rawlinson, W., Georgiou, A., Post, J. J., & Overton, K. (2021). Differences in antibiotic and antiviral use in people with confirmed influenza: A retrospective comparison of rapid influenza PCR and multiplex respiratory virus PCR tests. *BMC Infectious Diseases*, 21(1) doi:10.1186/s12879-021-06030-w
- Azab, M. A., & Azzam, A. Y. (2021). SARS-CoV-2 associated viral encephalitis with mortality outcome. *Interdisciplinary Neurosurgery: Advanced Techniques and Case Management*, 25 doi:10.1016/j.inat.2021.101132
- Babiarczyk, B., & Sternal, D. (2022). Analysis of self-care strategies among nurses in southern poland - A cross-sectional survey. *International Journal of Occupational Medicine and Environmental Health*, 35(1), 13-25. doi:10.13075/IJOMEH.1896.01802
- Bach, T. A., & Zaiken, K. (2017). Outcomes of treatment with direct-acting antivirals for infection with hepatitis C virus genotypes 1–4 in an ambulatory care setting. *American Journal of Health-System Pharmacy*, 74(5), S1-S9. doi:10.2146/ajhp160567
- Badr, A. F., Humedi, R. A., Alfarsi, N. A., & Alghamdi, H. A. (2021). Rapid antigen detection test (RADT) for pharyngitis diagnosis in children: Public and pharmacist perception. *Saudi Pharmaceutical Journal*, 29(7), 677-681. doi:10.1016/j.jsps.2021.04.029
- Bak, A. H., Makarewicz-Wujec, M., & Kozłowska-Wojciechowska, M. (2018). Self-medication with otc drugs during the flu or influenza among the residents of warsaw. sources of knowledge

- and awareness of dangers generated by inappropriate treatment. *Acta Poloniae Pharmaceutica - Drug Research*, 75(2), 555-562. Retrieved from www.scopus.com
- Bakken, I. J., Wensaas, K. -, Furu, K., Grøneng, G. M., Stoltenberg, C., Øverland, S., & Håberg, S. E. (2017). Legesøkning og legemiddeluttak etter innføring av nye fraværeregler. *Tidsskrift for den Norske Lægeforening*, 137(16) doi:10.4045/tidsskr.17.0427
- Banakh, I., Lam, A., Turek, M., Htet, T., & Vorlander, C. (2017). Rapid versus standard iron polymaltose infusions: A single centre safety study. *Journal of Pharmacy Practice and Research*, 47(2), 103-109. doi:10.1002/JPPR.1236
- Beechar, V. B., De La Flor, C., & Medford, R. J. (2020). Non-typeable haemophilus influenzae and purpura fulminans. *BMJ Case Reports*, 13(7) doi:10.1136/bcr-2020-234880
- Ben Mabrouk, A., Larbi Ammari, F., Werdani, A., Jemmali, N., Chelli, J., Mrabet, H. E., . . . Mahjoub, B. (2022). Parental self-medication with antibiotics in a tunisian pediatric center. *Therapies*, 77(4), 477-485. doi:10.1016/j.therap.2021.10.007
- Berenson, A. B., Chang, M., Hirth, J. M., & Kanukurthy, M. (2021). Intent to get vaccinated against COVID-19 among reproductive-aged women in texas. *Human Vaccines and Immunotherapeutics*, 17(9), 2914-2918. doi:10.1080/21645515.2021.1918994
- Berlingieri, G., Alvares, C. M. A., Serrano, R. V., Palma, L. F., & Campos, L. (2022). Phototherapies for COVID-19-associated opportunistic oral infections. *Photodiagnosis and Photodynamic Therapy*, 37 doi:10.1016/j.pdpdt.2021.102678
- Bernardo, C. D. O., Gonzalez-Chica, D., & Stocks, N. (2019). Influenza-like illness and antimicrobial prescribing in australian general practice from 2015 to 2017: A national longitudinal study using the medicineinsight dataset. *BMJ Open*, 9(4) doi:10.1136/bmjopen-2018-026396
- Bibby, H. L., de Koning, L., Seiden-Long, I., Zelyas, N., Church, D. L., & Berenger, B. M. (2022). A pragmatic randomized controlled trial of rapid on-site influenza and respiratory syncytial virus PCR testing in paediatric and adult populations. *BMC Infectious Diseases*, 22(1) doi:10.1186/s12879-022-07796-3
- Bouزيد, D., Lucet, J. -, Duval, X., Houhou-Fidouh, N., Casalino, E., Viseaux, B., . . . Ghazali, A. (2020). Multiplex PCR implementation as point-of-care testing in a french emergency department. *Journal of Hospital Infection*, 105(2), 337-338. doi:10.1016/j.jhin.2020.01.021
- Brooten, D., Youngblut, J. M., Caicedo, C., del Moral, T., Cantwell, G. P., & Totapally, B. (2018). Parents' acute illnesses, hospitalizations, and medication changes during the difficult first year after infant or child NICU/PICU death. *American Journal of Hospice and Palliative Medicine*, 35(1), 75-82. doi:10.1177/1049909116678597
- Burns, A., Goodlet, K. J., Chapman, A., & Roberts, E. P. (2020). A case report of self-medication with over-the-counter fish antibiotic: Implications for pharmacists. *Journal of the American Pharmacists Association*, 60(4), e121-e123. doi:10.1016/j.japh.2019.12.020
- Cai, Z. -, Liang, J. -, Lin, Y., & Huang, M. -. (2019). Antimicrobial prescribing for outpatients with laboratory-confirmed influenza in a large children's hospital: A retrospective study. [某大型儿童医院门诊流感患者抗菌药物使用情况回顾性分析] *Chinese Pharmaceutical Journal*, 54(16), 1336-1342. doi:10.11669/cpj.2019.16.012
- Calderón-Parra, J., Muñio-Míguez, A., Bendala-Estrada, A. D., Ramos-Martínez, A., Muñoz-Rubio, E., Carracedo, E. F., . . . Núñez-Cortés, J. M. (2021). Inappropriate antibiotic use in the COVID-19 era: Factors associated with inappropriate prescribing and secondary complications. analysis of the registry SEMI-COVID. *PLoS ONE*, 16(5 May) doi:10.1371/journal.pone.0251340
- Campos Fernández de Sevilla, M. Á., Gallego Úbeda, M., Heredia Benito, M., García-Cabrera, E., Monje García, B., Tovar Pozo, M., . . . Iglesias-Peinado, I. (2019). Implementation of a pharmaceutical care program for patients with hepatitis C treated with new direct-action antivirals. *International Journal of Clinical Pharmacy*, 41(2), 488-495. doi:10.1007/s11096-019-00809-3

- Cangini, A., Fortinguerra, F., Di Filippo, A., Pierantozzi, A., Da Cas, R., Villa, F., . . . Gagliotti, C. (2021). Monitoring the community use of antibiotics in Italy within the national action plan on antimicrobial resistance. *British Journal of Clinical Pharmacology*, 87(3), 1033-1042. doi:10.1111/bcp.14461
- Carballo, N., Garcia-Alzórriz, E., Ferrández, O., Navarrete-Rouco, M. E., Durán-Jordà, X., Pérez-García, C., . . . Grau, S. (2021). Impact of non-persistence on healthcare resource utilization and costs in patients with immune-mediated rheumatic diseases initiating subcutaneous TNF- α inhibitors: A before-and-after study. *Frontiers in Pharmacology*, 12 doi:10.3389/fphar.2021.752879
- Chae, C., Davies, N. G., Jit, M., & Atkins, K. E. (2020). Effect of pediatric influenza vaccination on antibiotic resistance, England and Wales. *Emerging Infectious Diseases*, 26(1), 138-142. doi:10.3201/eid2601.191110
- Chavoustie, S., Frost, M., Snyder, O., Owen, J., Darwish, M., Dammerman, R., & Sanjurjo, V. (2017). Buprenorphine implants in medical treatment of opioid addiction. *Expert Review of Clinical Pharmacology*, 10(8), 799-807. doi:10.1080/17512433.2017.1336434
- Chen, L., Han, X., Li, Y. L., Zhang, C., & Xing, X. (2020). The impact of early neuraminidase inhibitor therapy on clinical outcomes in patients hospitalised with influenza A-related pneumonia: A multicenter, retrospective study. *BMC Infectious Diseases*, 20(1) doi:10.1186/s12879-020-05322-x
- Chen, Y., Yu, H., Guo, F., Wu, Y., & Li, Y. (2018). Antinociceptive and anti-inflammatory activities of a standardized extract of bis-iridoids from *Pteroccephalus hookeri*. *Journal of Ethnopharmacology*, 216, 233-238. doi:10.1016/j.jep.2018.01.035
- Chiappini, E., Motisi, M. A., Becherucci, P., Pierattelli, M., Galli, L., & Marchisio, P. (2020). Italian primary care paediatricians' adherence to the 2019 national guideline for the management of acute otitis media in children: A cross-sectional study. *International Journal of Pediatric Otorhinolaryngology*, 138 doi:10.1016/j.ijporl.2020.110282
- Chukwu, E. E., Oladele, D. A., Enwuru, C. A., Gogwan, P. L., Abuh, D., Audu, R. A., & Ogunola, F. T. (2021). Antimicrobial resistance awareness and antibiotic prescribing behavior among healthcare workers in Nigeria: A national survey. *BMC Infectious Diseases*, 21(1) doi:10.1186/s12879-020-05689-x
- Chukwuone, C. A., Onuoha, K. M., & Maxwell, L. C. (2022). Self-medication among undergraduates: A case study of University of Nigeria, Nsukka. *Journal of Home Economics Research*, 29(2), 76-85. Retrieved from www.scopus.com
- Coppock, K. (2018). Overuse of acetaminophen more common during flu season. *Pharmacy Times*, 2018(September) Retrieved from www.scopus.com
- Cortez, J., Rosário, E., Pires, J. E., Tabora Lopes, J., Francisco, M., Vlieghe, E., & Brito, M. (2017). Antimicrobial storage and antibiotic knowledge in the community: A cross-sectional pilot study in north-western Angola. *International Journal of Infectious Diseases*, 60, 83-87. doi:10.1016/j.ijid.2017.05.011
- Creedon, T. B., Zuvekas, S. H., Hill, S. C., Ali, M. M., McClellan, C., & Dey, J. G. (2022). Effects of Medicaid expansion on insurance coverage and health services use among adults with disabilities newly eligible for Medicaid. *Health Services Research*, 57(S2), 183-194. doi:10.1111/1475-6773.14034
- Crunkhorn, C., van Driel, M., Nguyen, V., & McGuire, T. (2017). Children's medicine: What do consumers really want to know? *Journal of Paediatrics and Child Health*, 53(2), 155-162. doi:10.1111/jpc.13339
- Cuyle, P. -, & Prenen, H. (2018). Practical management of toxicities associated with targeted therapies for advanced gastroenteropancreatic neuroendocrine tumors. *Annals of Gastroenterology*, 31(2), 140-150. doi:10.20524/aog.2018.0224
- Dal Negro, R. W., Zanasi, A., Turco, P., & Povero, M. (2018). Influenza and influenza-like syndromes: The subjects' beliefs, the attitude to prevention and treatment, and the impact in Italian general population. *Multidisciplinary Respiratory Medicine*, 13(1) doi:10.1186/s40248-018-0119-6

- Dale, A. P., Ebell, M., McKay, B., Handel, A., Forehand, R., & Dobbin, K. (2019). Impact of a rapid point of care test for influenza on guideline consistent care and antibiotic use. *Journal of the American Board of Family Medicine*, 32(2), 226-233. doi:10.3122/jabfm.2019.02.180183
- Davidson, E. R., Snider, M. J., Bartsch, K., Hirsch, A., Li, J., & Larry, J. (2020). Tolerance of proprotein convertase Subtilisin/Kexin type 9 (PCSK9) inhibitors in patients with self-reported statin intolerance. *Journal of Pharmacy Practice*, 33(3), 276-282. doi:10.1177/0897190018799218
- de Martino, M., Chiarugi, A., Boner, A., Montini, G., & de' Angelis, G. L. (2017). Working towards an appropriate use of ibuprofen in children: An evidence-based appraisal. *Drugs*, 77(12), 1295-1311. doi:10.1007/S40265-017-0751-Z
- Delyagin, W. M. (2021). Specific therapy and emergency prevention of flu. *Meditinskiy Sovet*, 2021(1), 116-123. doi:10.21518/2079-701X-2021-1-116-123
- Devaraj, N. K., Rashid, A. A., Abdullah, K. H. A., & Manap, A. H. A. (2021). Antidepressant discontinuation syndrome – a case report. *Malta Medical Journal*, 33(1), 116-120. Retrieved from www.scopus.com
- Di Giambenedetto, S., Ciccullo, A., Borghetti, A., Gambassi, G., Landi, F., Visconti, E., . . . Gasbarrini, A. (2020). Off-label use of tocilizumab in patients with SARS-CoV-2 infection. *Journal of Medical Virology*, 92(10), 1787-1788. doi:10.1002/jmv.25897
- Doherty, T. M., Hausdorff, W. P., & Kristinsson, K. G. (2020). Effect of vaccination on the use of antimicrobial agents: A systematic literature review. *Annals of Medicine*, 52(6), 283-299. doi:10.1080/07853890.2020.1782460
- Drury, J. (2018). Sick days because of a cold or a cough: How brown bagging can bring clarity. *Pharmacy Times*, 2018(November) Retrieved from www.scopus.com
- El Guerche-Séblain, C., Moureau, A., Schiffler, C., Dupuy, M., Pepin, S., Samson, S. I., . . . Schellevis, F. (2019). Epidemiology and burden of influenza in healthy children aged 6 to 35 months: Analysis of data from the placebo arm of a phase III efficacy trial. *BMC Infectious Diseases*, 19(1) doi:10.1186/s12879-019-3920-8
- Fahy, E. F., McCarthy, E., Steinhagen-Thiessen, E., & Vaughan, C. J. (2017). A case of autosomal recessive hypercholesterolemia responsive to proprotein convertase subtilisin/kexin 9 inhibition. *Journal of Clinical Lipidology*, 11(1), 287-288. doi:10.1016/j.jacl.2016.10.002
- Fardeau, C., Simon, A., Rodde, B., Viscogliosi, F., Labalette, P., Looten, V., . . . LeHoang, P. (2017). Interferon-alpha2a and systemic corticosteroid in monotherapy in chronic uveitis: Results of the randomized controlled BIRDFERON study. *American Journal of Ophthalmology*, 177, 182-194. doi:10.1016/j.ajo.2017.03.001
- Fjelltveit, E. B., Cox, R. J., Kittang, B. R., Blomberg, B., Buanes, E. A., Langeland, N., . . . Brokstad, K. A. (2022). Lower antibiotic prescription rates in hospitalized COVID-19 patients than influenza patients, a prospective study. *Infectious Diseases*, 54(2), 79-89. doi:10.1080/23744235.2021.1974539
- Flicoteaux, R., Protopopescu, C., Tibi, A., Blanchon, T., Van der Werf, S., Duval, X., . . . Chevret, S. (2017). Factors associated with non-persistence to oral and inhaled antiviral therapies for seasonal influenza: A secondary analysis of a double-blind, multicentre, randomised clinical trial. *BMJ Open*, 7(7) doi:10.1136/bmjopen-2016-014546
- Fu, X., Zhang, Y., Chang, L., Hui, D., Jia, R., Liu, N., . . . Li, Q. (2020). The jpdj has synergistic effect with fluoropyrimidine in the maintenance therapy for metastatic colorectal cancer. *Recent Patents on Anti-Cancer Drug Discovery*, 15(3), 257-269. doi:10.2174/1574892815666200717141205
- Fujibayashi, K., Takahashi, H., Tanei, M., Uehara, Y., Yokokawa, H., & Naito, T. (2018). A new influenza-tracking smartphone app (flu-report) based on a self-administered questionnaire: Cross-sectional study. *JMIR mHealth and uHealth*, 6(6) doi:10.2196/mhealth.9834