



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Available online at
ScienceDirect
 www.sciencedirect.com

Elsevier Masson France
EM|consulte
 www.em-consulte.com/en



Letter to the Editor

Infectious diseases and primary care telemedicine in France



ARTICLE INFO

Keywords:
 Telemedicine
 Community-acquired
 COVID-19

The use of telemedicine has significantly increased in recent years, especially during the COVID-19 pandemic, thanks to affordable technology and softened regulation.

However, the main reasons for consulting a physician via video are unknown, especially regarding infectious diseases.

We aimed to describe the organization of a telemedicine company and to analyze the various types of infectious diseases managed during those teleconsultations. We performed a retrospective study of all teleconsultations registered in the French database of a telemedicine company from January 1, 2020 to December 31, 2020.

We identified all teleconsultations associated with an infectious disease diagnosis, using the international classification disease 10th version (ICD-10), and the following codes: Axx, Bxx, H10x, H60x, H66x, H92, Jxx, N1x-4x, N7x, R300, R509, L01-08, Z11x-13x, and U071.

The medical video consultation process in France is based on a nationwide digital health care center, open for patients from 7 am to midnight every day. Most consultations consist of unscheduled appointments with family physicians.

Through an application on their smartphone, patients fill in the information required to verify their identity as well as other details needed for health care coverage and follow-up (Fig. 1). Once registered, they select a reason for consultation (e.g. cough, fever, dysuria) and then complete a questionnaire of approximately 10 questions specifically related to each reason. This process identifies cases unsuitable for video consultation, i.e. any medical condition requiring physical examination, and informs patients before any booking.

Before the video consultation, the physician has access via the company's software to the patient's medical records (in case of prior consultations) and to the patient's questionnaire, as well as photographs or previous treatment prescriptions when available. During the consultation, through secure video transmission, several clinical exams can be performed, e.g. respiratory rate count, visual inspection of the throat, etc. If needed, an e-prescription or other documents can be issued and sent to the patient securely via the application.

From January 1, 2020 to December 31, 2020, the total number of ICD-10 diagnoses was 142,010; 70,590 (49.7%) were for infectious diseases (IDs).

The main ID ICD-10 diagnoses were: COVID-19 (U071; n = 31,121; 44.1%), acute upper respiratory infections (J00-J06; n = 10,133; 14.4%), cystitis, urethritis, and urethral syndrome (N30-N34; n = 6,745; 9.6%), gastroenteritis and colitis of infectious and unspecified origin (A09; n = 5,791; 8.2%), and special screening examination for infectious and parasitic diseases (Z11; n = 2,769; 3.9%).

Telemedicine is increasingly being used for healthcare services thanks to their ability to eliminate distance barriers and therefore improve access to care. In our study, IDs represented almost half of the activity of telemedicine.

The main reasons for teleconsultation in our study seemed to be the same as those observed in usual primary care. Indeed, according to data from the French primary care observatory, which identified the main diagnoses found during in-person consultations, fever was the second reason for consultation in primary care [1].

When considering antibiotic prescriptions in community settings, the most frequent indications are usually respiratory tract infections (67%), including ENT (Ear, Nose and Throat) infections (42%), and urinary tract infections (UTI) (15%) [2], as found in our study.

Furthermore, several studies found that telemedicine has led to improved clinical outcomes and cost-savings for various diseases such as hepatitis C virus (HCV), human immunodeficiency virus (HIV), and tuberculosis [3–10].

However, little is known about ID-related activity during telemedicine. Indeed, telemedicine could lead to antibiotic overprescription due to the difficulty to assess viral etiology in most situations and/or to the absence of physical exam. Thus, it is of major importance to assess the quality of antibiotic prescription, and therefore to perform audit on antibiotic prescription related to telemedicine activity.

The main limitations of our study are the anonymous nature of our database with no possibility to identify identical patients, possibly leading to an overestimated number of consultations for the same disease in a single patient. Secondly, we had no access to population characteristics, prescriptions, and outcomes of patient. Finally, we only assessed one company while there are various organizations, with different procedures according to companies and countries.

We present the first report on IDs managed through primary care telemedicine in France. ID consultation represents an important part of the telemedicine activity, especially respiratory and urinary tract infections, similar to the usual primary care activity. Additional data are needed on the type of prescription and outcome of this type of management which could be a major driver for antimicrobial stewardship. Quality improvement, interconnexion,

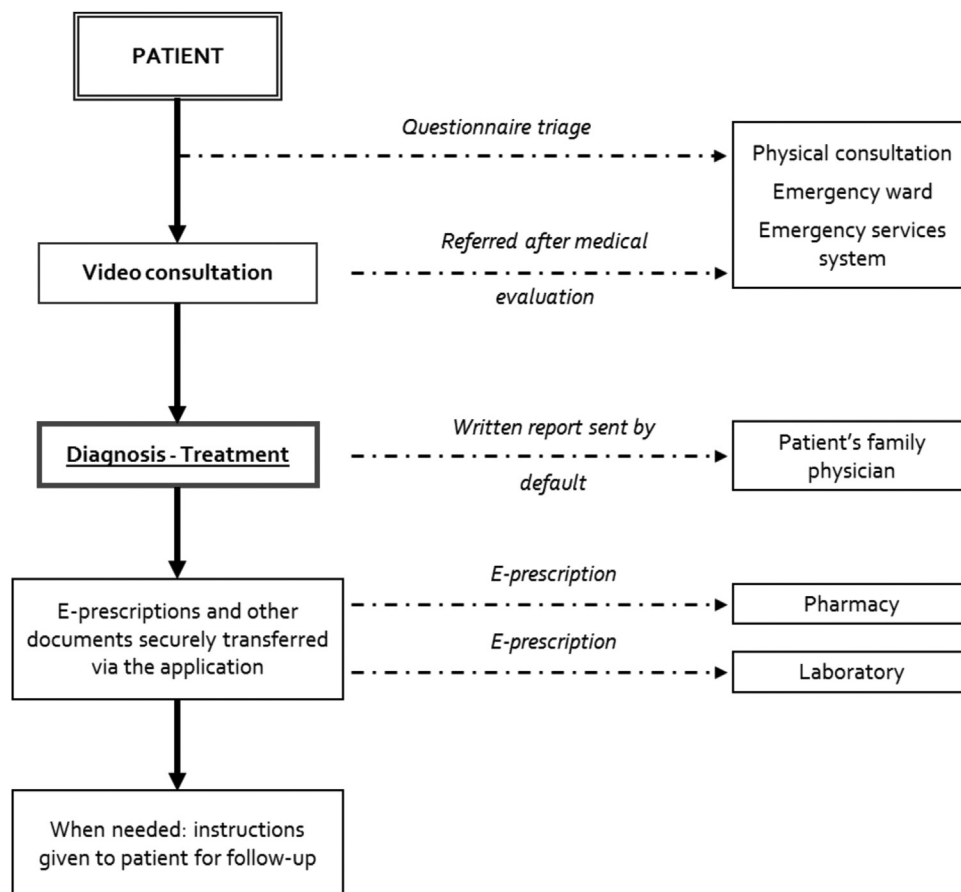


Fig. 1. Patient pathway.

and accessibility to these types of databases are an opportunity for clinical research.

Funding

None.

Contributions of authors

All authors were involved in designing the study, analyzing the data, and writing the article.

Disclosure of interest

Laurent Haas, Axel Rodhe, and Maxime Cauterman are employees of the Livi Company. The other authors declare that they have no competing interest.

Ethics approval

The research was conducted in accordance with the Declaration of Helsinki, and national and institutional standards.

References

[1] Société Française de Médecine Générale (SFMG). [General Practice Observatory: Most frequent diagnosis in Community setting][In French] 2009. <http://omg.sfm.org/content/donnees/top25.php>.(accessed December 7, 2021).

[2] Agence nationale de sécurité du médicament et des produits de santé (ANSM). [Evolution of antibiotic consumption in France between 2000 and 2015][In French] 2017. <https://www.antibio-responsable.fr/antibioresistance/>

[surconsommation-d-antibiotiques/-/media/ems/conditions/consumer health care/antibiotherapie/pdf/ANSM-rapport-antibio-janv2017.pdf](https://www.surconsommation-d-antibiotiques/-/media/ems/conditions/consumer_health_care/antibiotherapie/pdf/ANSM-rapport-antibio-janv2017.pdf) (accessed December 7, 2021).

[3] Kenealy TW, Parsons MJG, Rouse APB, Doughty RN, Sheridan NF, Hindmarsh JKH, et al. Telecare for diabetes. CHF or COPD: effect on quality of life, hospital use and costs. A randomised controlled trial and qualitative evaluation. PLoS One 2015;10:e0116188, <http://dx.doi.org/10.1371/journal.pone.0116188>.

[4] Vasilopoulou M, Papaioannou AI, Kaltsakas G, Louvaris Z, Chynkiamis N, Spetsioti S, et al. Home-based maintenance tele-rehabilitation reduces the risk for acute exacerbations of COPD, hospitalisations and emergency department visits. Eur Respir J 2017;49:1602129, <http://dx.doi.org/10.1183/13993003.02129-2016>.

[5] Ulrik CS, Ringbæk T, Laursen LC, Green A, Brøndum E, Frausing E. Effect of tele health care on exacerbations and hospital admissions in patients with chronic obstructive pulmonary disease: a randomized clinical trial. Int J Chron Obstruct Pulmon Dis 2015;1801, <http://dx.doi.org/10.2147/COPD.S85596>.

[6] Eron L, King P, Marineau M, Yonehara C. Treating acute infections by telemedicine in the home. Clin Infect Dis 2004;39:1175–81, <http://dx.doi.org/10.1086/424671>.

[7] Assimacopoulos A, Alam R, Arbo M, Nazir J, Chen D-G, Weaver S, et al. A brief retrospective review of medical records comparing outcomes for inpatients treated via telehealth versus in-person protocols: is telehealth equally effective as in-person visits for treating neutropenic fever, bacterial pneumonia, and infected bact. Telemed e-Health 2008;14:762–8, <http://dx.doi.org/10.1089/tmj.2007.0128>.

[8] Parmar P, Mackie D, Varghese S, Cooper C. Use of telemedicine technologies in the management of infectious diseases: a review. Clin Infect Dis 2015;60:1084–94, <http://dx.doi.org/10.1093/cid/ciu1143>.

[9] Young JD, Abdel-Massih R, Herchline T, McCurdy L, Moyer KJ, Scott JD, et al. Infectious diseases society of america position statement on telehealth and telemedicine as applied to the practice of infectious diseases. Clin Infect Dis 2019;68:1437–43, <http://dx.doi.org/10.1093/cid/ciy907>.

[10] Abdel-Massih RC, Mellors JW. Telemedicine and infectious diseases practice: a leap forward or a step back? Open Forum Infect Dis 2019;6:ofz196, <http://dx.doi.org/10.1093/ofid/ofz196>.

H. Mascitti^a
C. Duran^a
F. Bouchand^b

L. Haas^c
 A. Rodhe^c
 M. Cauterman^c
 A. Dinh^{a,*}

^a Infectious diseases department, Raymond-Poincaré University Hospital, AP-HP, Paris Saclay University, 104, boulevard R. Poincaré, 92380 Garches, France

^b Pharmacy department, Raymond-Poincaré University Hospital, AP-HP, Paris Saclay University, Garches, France

^c Livi, Paris, France

* Corresponding author.

E-mail address: aurelien.dinh@aphp.fr (A. Dinh)

Available online 21 March 2022

<https://doi.org/10.1016/j.idnow.2022.03.005>

2666-9919 © 2022 Elsevier Masson SAS. All rights reserved.

Expectations and acceptability of long-acting injectable antiretrovirals by patients living with HIV/AIDS



ARTICLE INFO

Keywords:

HIV
 Acceptability
 LAI-ART

Many patients living with HIV (PLHIV) are still facing numerous physical, emotional, and psychosocial challenges in relation to daily oral antiretrovirals (ART) [1]. In a recent online survey of 2,389 PLHIV on ART in 25 countries, 54.7% preferred a long-acting regimen [2]. In the therapeutic arsenal of HIV, a dual long-acting injectable antiretroviral therapy (LAI-ART) including an integrase strand transfer inhibitor (INSTI) (cabotegravir) and a non-nucleoside reverse transcriptase inhibitor (NNRTI) (rilpivirine) is to be launched with comparable immunovirological effectiveness as oral ARTs [3,4]. Practical modalities are yet to be clearly defined (frequency of injections: every month or two) and require reflection from healthcare teams whether to offer this therapeutic option to PLHIV. Our objective was to describe the potential expectation and acceptability of injectable ARTs by PLHIV followed in our infectious diseases department.

The survey was conducted in February 2020 in a Teaching Hospital of Paris, France (HIV-care Units), among PLHIV treated with oral ART. An anonymous questionnaire was handed out in the waiting room before the medical consultation.

The questionnaire was administered to 130 PLHIV: 43 females (33%) and 87 males (67%), with a median age of 52 years [30–76]. Associated chronic diseases were reported in 60% (71/130) of cases. The median lifespan with HIV was 17 years [0–40] and the median duration of ART use was 14.5 years [0–34]. Current antiretroviral treatment modalities were: number of tablets taken per day (1 tablet = 87/130 (67%); 2 tablets = 16/130 (12%); 3 tablets = 20/130 (15%); and > 4 tablets = 7/130 (6%)); frequency of daily treatment (QD = 117/130 (90%) and BID = 13/130 (10%); number of days per week (7 days per week = 124/130 (95%) and 4 days per week = 6/130 (5%)). Difficulties with treatment were expressed by 39% (51/131) of PLHIV, with the main reasons being large-size tablets (22/51; 43%), bulky treatment boxes (19/51; 37%), difficulties in accepting the disease (17/51; 33%), and side effects (17/51; 33%). Among the PLHIV surveyed, 65% (85/130) would be in favor of a therapeutic

change to injectable ARTs. Advanced arguments were psychological benefits of a non-daily treatment (71/85; 84%); desire to contribute to the advancement of HIV treatment (54/85; 64%); no longer thinking about the disease outside of medical appointments (38/85; 48%); discretion toward relatives (34/85; 40%), employer (17/85; 20%) and spouse (14/85; 16%) unaware of HIV status; no longer being afraid of forgetting to take ARTs (32/85; 38%). Reasons given by the 35% (45/130) of PLHIV who would refuse injectable ARTs were: having to come to the hospital every month or two while they currently have a medical follow-up every six months (26/45; 58%); fear of needles (22/45; 49%); used to their current ARTs (18/45; 40%) and fear of changing ARTs (11/45; 24%); already on a daily treatment for other chronic diseases (13/45; 29%); little scientific data on this new treatment (9/45; 20%).

A majority (65%) of PLHIV would be interested in an injectable ART despite already receiving a single-tablet regimen, considering the benefit of a non-daily treatment. This psychological benefit for patients should be taken into account in the delivery of this treatment and organization of hospital services. Similar results were reported by other teams [5,6] with greater patient acceptability if the injection was to be performed every two months.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments.

Funding

No funding was received for the submitted work.

Disclosure of interest

Dr Palacios has received financial support (travel/accommodations/meeting expenses unrelated to activities listed) from Gilead Science and MSD, outside the submitted work. Dr Chas received financial support as an adviser from Gilead Sciences and ViiV Healthcare. Dr Siguier reports personal fees from ViiV Healthcare and Gilead Sciences, non-financial support from Gilead Sciences. Dr Pialoux reports personal fees as Advisory Board membership for congress support from ViiV Healthcare, Gilead, AbbVie, Janssen, and MSD, outside the submitted work. For the remaining authors none were declared.

References

- [1] De Los Rios P, Okoli C, Castellanos E, Allan B, Young B, Brough G, et al. Physical, emotional, and psychosocial challenges associated with daily dosing of HIV medications and their impact on indicators of quality of life: findings from the positive perspectives study. *AIDS Behav* 2021;25:961–72.
- [2] De Los Rios P, Okoli C, Young B, Allan B, Castellanos E, Brough G, et al. Treatment aspirations and attitudes towards innovative medications among people living with HIV in 25 countries. *Popul Med* 2020;2. <http://dx.doi.org/10.18332/popmed/124781>.
- [3] Orkin C, Oka S, Philibert P, Brinson C, Bassa A, Gusev D, et al. Long-acting cabotegravir plus rilpivirine for treatment in adults with HIV-1 infection: 96-week results of the randomised, open-label, phase 3 FLAIR study. *Lancet HIV* 2021;8:e185–96.
- [4] Margolis DA, Gonzalez-Garcia J, Stellbrink H-J, Eron JJ, Yazdanpanah Y, Podzamczar D, et al. Long-acting intramuscular cabotegravir and rilpivirine in adults with HIV-1 infection (LATTE-2): 96-week results of a randomised, open-label, phase 2b, non-inferiority trial. *Lancet* 2017;390:1499–510.
- [5] Khuong-Josses MA, Buson M, Charpentier C, Poupard M. Will HIV-infected patients taking oral ARV switch to long-acting injectable ART when it becomes available? *EACS* 2019. [Basel 2019 https://www.natap.org/2019/EACS/EACS_94.htm](https://www.natap.org/2019/EACS/EACS_94.htm).
- [6] Carillon S, Gallardo L, Linard F, Chakvetadze C, Viard J-P, Cros A, et al. Perspectives of injectable long acting antiretroviral therapies for HIV treatment or prevention: understanding potential users' ambivalences. *AIDS Care* 2020;32:155–61.