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.

evaluate patient experience of increased MDT input during home IVs and identify areas for further improvement.
Results: Patient feedback is very positive, with 80% of respondents reporting the level of input from the new service was the right level for their needs. Comments from patients include "they no longer feel forgotten" when on home IVs. On review of the last 50 home IV courses, 34% of VWR individual patient reviews resulted in a treatment change to acute or chronic therapies and new information on adherence was gained in a quarter of cases. The majority of patients are now able to finish their IVs at home without an end of IV clinic appointment. This has beneficially reduced direct contact during the COVID-19 pandemic. An area identified for improvement by patients was the addition of dietetic and psychosocial support.
Conclusion: VWR and enhanced MDT input to a home IV service promotes a bespoke, efficient and holistic approach to CF care.

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The effect of training about nebuliser cleaning and disinfection on the knowledge levels and practises of the caregivers of patients with cystic fibrosis

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Objectives: Nebulisers can be contaminated with microorganisms and may be a source of infection in the lower airways in patients with cystic fibrosis (CF). We aimed to increase the knowledge of cystic fibrosis (CF) patients' caregivers via a standardised training program for nebuliser cleaning and disinfection. We performed pre-/post- tests to measure swab cultures from the nebulisers.
Methods: A questionnaire about nebuliser cleaning was applied to caregivers of the 173 CF patients. Training sheets were given, one-hour practical training was performed, and swab samples were taken from the nebulisers of 102 CF patients. A questionnaire was applied after 1–3 months.
Results: The mean age was 9.8 ± 6.5 years. The person completing the questionnaire was 82.5% of the time the mother. The cleaning rate of the nebuliser after each use was 58.4% while disinfection rate was 33.6%. After the education, this ratio was 78% and 75.7%, respectively (p value <0.01 and <0.01 respectively). Among swab samples taken, at least one microorganism grew in 41 (40.2%) of the nebulisers. With the exception of *Stenotrophomonas maltophilia,* none of the organisms identified are considered as major pathogens of CF. Microbiological growth rate for the ones who disinfect nebulisers after each use or daily (n = 40) was 35% (n = 14) while it was 43.5% (n = 27) for the others (n = 62) (p = 0.39). No relationship was found between nebuliser cleaning/disinfection frequencies/methods, storing places and microbiological growth.
Conclusions: After the education, the rate of disinfection and cleaning was increased. Cleaning of nebuliser parts should be taught via education programs.

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The role of the clinical pharmacy specialist in monitoring adherence to inhaled therapies in patients with cystic fibrosis in the Republic of North Macedonia

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Aim: A major problem in the treatment of cystic fibrosis is nonadherence to inhaled therapies, which can influence lung function and health outcomes in patients with cystic fibrosis (CF). Our aim is to determine the adherence to inhaled therapy after providing medications closer to home and the active role of the pharmacist in the process and education of patients.
Material and methods: For greater availability of patients to therapy and better adherence to it, drug distribution was organised in 20 hospital pharmacies in 18 cities around the country. A clinical pharmacy specialist from the CF centre at the Institute for Pulmonary Diseases in Children, Skopje, R. North Macedonia was actively involved in educating patients about the importance of inhalation therapy and its proper use. Patients' adherence to therapy was monitored monthly for each inhaled medication (dornase alfa, tobramycin, and collomycin). Adherence was calculated for 2019–2020.
Results: The study included 101 patients with CF (range 0.25–43 years, median 21.6 y; 60 males). Total adherence to therapy in 2019 was 75% and in 2020 was 84% for all three inhaled medications used at home. Improvement in adherence to therapy was observed. Adherence in children younger than 14 years was 95%.
Conclusion: Providing medication closer to home improved adherence to therapy in patients with CF. The role of the clinical pharmacy specialist showed increase medication adherence and better quality of care for patients with CF.

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Features of the immune response to *Mycobacterium abscessus* complex (MABSC) and the influence of BCG vaccination

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Background: We aimed to characterise the adaptive immune response to MABSC and its possible cross-reaction with the BCG vaccination.
Methods: 17 CF patients with NTM history (CF/NTM+), 15 CF patients without NTM history (CF/NTM-), nine non-CF controls vaccinated with BCG (C/BCG+) and eight unvaccinated controls (C/BCG-) had their anti-MABSC immunity assessed in terms of cellular response (using flow cytometry, Fig. 1), humoral response (measurement of anti-MABSC IgG) and cytokine production.
Results: 15/17 individuals in the CF/NTM+ group, 11/15 in the CF/NTM- group, 9/9 in the C/BCG+ group and 3/8 in the C/BCG- group had lymphocyte proliferation upon stimulation with MABSC (Table 1). The lymphocyte proliferation intensity was significantly higher in the CF/NTM+ group than in the C/BCG- but not in the C/BCG+ group (Table 1, Fig. 2). Significance was also seen in comparison with the CF/NTM- group, when two BCG-vaccinated patients were removed from this group (Fig. 2). In all groups, T cells were more frequent than B cells, with a predominance of CD4 over CD8T cells. Memory T (Fig. 3) and B cells (Fig. 4) were also present. IgG levels were significantly higher in the CF/NTM+ and CF/NTM- groups than in both control groups (Fig. 4). After stimulation, plasma levels of IFN-γ and TNF-α significantly increased in all groups. IL-2 significantly increased in the CF/NTM+ and CF/NTM- groups only (Fig. 5). CD40L, IL-4 and IL-5 significantly decreased in the CF/NTM- group, and IL-17 did not change in any of the groups (Fig. 5).
Conclusion: The anti-MABSC immune response is mediated by T (especially CD4) cells, apparently with IFN-γ and TNF-α being the main drivers and IL-2 playing a role in the response of CF patients. B-cell-associated cytokines seem to be downregulated in all groups, but anti-MABSC IgG levels are significantly higher in CF patients than in controls. Finally, the immunity yielded by the BCG vaccination seems to cross-react with MABSC (Fig. 2).