

Inspiration

The Löwenstein Medical Magazine

Summer 2022 Edition

LeoLytics.anesthesia

Digital Revolution in Anesthesia

LENA. A MASK KEEPS ITS PROMISE.

Day-to-day test passed.

COEXISTING COPD AND SDB.

Fields of competence and interactions.

SUSTAINABILITY IS A QUESTION OF MORALITY.

Perspective for the future.

A photograph of a woman in a wheelchair and a man sitting on a beach at sunset. The woman is wearing a yellow jacket and glasses, and the man is wearing a grey t-shirt. They are both looking towards the right, where the sun is setting over the ocean. The beach is wet and reflective.

Innovations.
For life.

LÖWENSTEIN
medical

b r e a t h e

difference

We are working on gender responsive editions of Inspiration and other Löwenstein communication materials. As this involves many authors, we ask for a little patience until we are at a common and fair state of optional addresses.

Contents

Introduction	5
LENA. A mask keeps its promise	8
LeoLytics.anesthesia	12
Coexisting COPD and SDB	16
Research News	20
LUIZA Design Award	24
What are these large tanks?	26
Sustainability is a question of morality	30
Technical Training goes digital	34
Löwenstein Medical Netherlands – a portrait	36
Inspiration. A magazine with history	38
Have you heard?	40

ÖWENSTEIN
medical

Introduction

Hello to our patients, clients, partners, employees!

Although we are currently living in very turbulent times and the war in Ukraine is apparently far from over, society has returned to some degree of normality. As a self-protection measure, humans tend to revert to familiar patterns quickly. At Löwenstein, however, nothing much has returned to normal. Fortunately, this has nothing to do with the war in Ukraine, during which we are trying to provide support in the form of various projects. For example, our staff has organized several aid convoys; we have provided support not only with everyday relief goods, but also with urgently needed medical equipment. In addition, there were several internal fund raising activities.

However, what many do not suspect, although the press reports on it daily: We have been fighting for parts and freight capacity on a daily basis for months. Although medical technology is given priority, it is not always given the highest priority, for example in the case of electronics. Politically, automotive parts in particular are given higher priority because of the economic added value and jobs. We are straining our global medical product supply security because other industries have the higher economic value. Costs in the health care system are rising even more than they already are on account of demographics, and this is being borne on the backs of patients.

In addition, there is the much discussed European “Medical Device Regulation”, MDR for short. Setting and tightening standards across the EU is also a competitive advantage against manufacturers from other parts of the world. For a long time, however, it was believed that medical device manufacturers would not be able to implement it in time. However, the shortages are not caused by the companies, even if smaller companies are struggling to implement the MDR and older products that could actually still serve their purpose are being withdrawn from the range because of excessive costs. Instead, it seems that the Notified Bodies are the ones ill prepared. We are experiencing the greatest bureaucratic disaster in medical device history. These Notified Bodies are not able to cope with the rush of applications. Simple address changes on certificates take months to finalize. Every change to a product must be reviewed and approved by the Notified Body in terms of documentation, even though manufacturers have been putting these products on the market for decades without any major quality problems. Whether this will really prevent poor quality in the market remains to be seen. However, it certainly prevents agile innovation, especially from start-ups and medium-sized companies.

Talking about innovation: We are currently concerned with two major trends in medical technology. Digitalization, especially in the form of networked devices, and sustainability, especially because of the high rates of disposable products. You can read articles on both topics

in this magazine. As a broad provider of respiratory solutions ranging from CPAP to neonatal intensive care ventilators, we have been specifically investing in networking our devices with external systems (e.g., monitoring and AIs) as well as in networking our devices with each other for many years, e.g., to combine diagnostics and therapy (therapy control of a COPD patient using poligraphy). In addition, we have set our sights on making the transition of ventilated ICU patients to home therapy via IMC as simple as possible through the adoption of setting parameters and by ensuring similar operating philosophies across all devices.

The sustainability discussion has two facets: On the one hand, companies are expected to be as ecological as possible in their daily operations. Investments in photovoltaics and modern lighting and electrical technology, e-cars in vehicle fleets wherever possible, waste separation and reduction, reduced resource consumption and travel optimization, etc. We are continuously working on this. Fortunately, we are one of the companies that leave a small overall environmental footprint. On the other hand, the use of environmentally and socially sustainable materials in products is becoming increasingly important. This is also something we aspire to. However, reality is far more complicated. With the current supply shortages, we are happy to be able to produce at all. When it comes to the use of ecological materials such as biodegradable plastics, the associated technology has not yet reached the stage where they can be used to manufacture medical devices for use on patients. In this case, the MDR and especially biocompatibility play a further role. In the coming years, we will nevertheless try to positively influence this process and ensure greater sustainability in medical technology.

Despite all the challenges and changes, we manage to care for many thousands of patients, either directly or through our reliable partners around the world, by constantly developing ourselves as a company, our services and our products.

Enjoy reading. If you have any comments or ideas about our topics, please feel free to contact us at public@loewensteinmedical.com

Kind regards,
Benjamin Löwenstein



Life is never perfect ...

... but there are people, relationships, experiences that come damn close to perfect moments. We develop our products to do their best job in the midst of life. Individual, flexible, as little disruptive as possible.

Löwenstein. We love that perfect moment.



[loewensteinmedical.com](https://www.loewensteinmedical.com)

With people in mind

LENA. A mask keeps its promise.

by Tanja Derlien



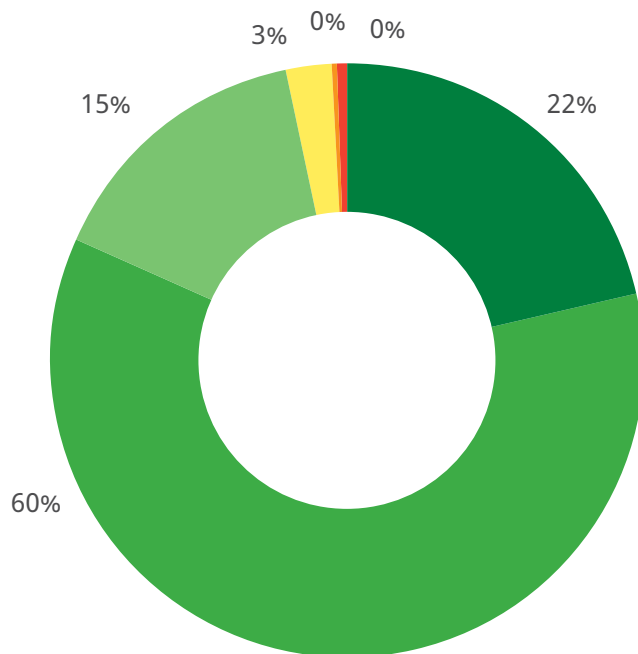
LENA in the testing phase.

LENA not only promises a stable mask fit, it also delivers on its promise. This is proven in practical testing. With excellent results.

As you learned from older Inspiration issues, our masks are tested in practice several times during their stages of development. The same applies to LENA.

This time, however, pandemic-related access restrictions to hospitals posed a far greater challenge to realize our high requirements for broad-based testing. We therefore mainly conducted our usability tests outside of hospitals. The results already reflected LENA's great performance. To confirm this in a larger field test, we decided to conduct a 3-month

LENA. Hard to beat in terms of handling.



GENERAL MASK HANDLING BY THE PATIENT

Fig. 1: Overall Usability Score by school grades 1-6.

- 1 - excellent
- 2 - good
- 3 - satisfactory
- 4 - adequate
- 5 - poor
- 6 - failed

controlled market introduction at Löwenstein Medical.

In particular, we investigated whether the horizontal and vertical divisions of the 3 mask cushions were optimally selected and whether the double-lipped mask cushion could withstand the various pressure requirements up to 35 mbar as well as high pressure differences in BiLevel therapy.

CHECKED AT INITIAL CONTACT AND AFTER 10 DAYS OF USE.

The Löwenstein colleagues were asked to evaluate LENA

online both upon initial contact – newly fitted or refitted – and after 10 days of use (follow-up) after consultation with the patient.

All patients participated absolutely voluntarily and data were collected only after they had provided their consent. In addition to the “long-term experience”, we felt it important to gain a reflection of the patient’s and expert’s first impression. The first minutes are often decisive to ascertain whether a mask fits or not. More than 550 questionnaires were completed, 223 of which

were completed after using LENA for several days – at last, the broad first hand experience we wanted to see.

LENA CONVINCES WITH EXCELLENT RESULTS.

After the patients had used LENA for several nights and during their daily routine, including putting it on and taking it off and cleaning it, they rated LENA’s handling, its so-called usability, as outstanding. 97% rated it as excellent to satisfactory. You can see the overall grades in Figure 1.

Life itself is the best test. LENA convinces in everyday life.

In addition to using LENA daily, its fit is the decisive criterion for wanting to wear the mask permanently. Figure 2 shows the division of the facial areas.

To get a better idea of exactly where problems might occur, we divided the face into 4 areas and asked for all 4 areas to be assessed.

Due to higher therapy pressures, the headgear is sometimes tightened even more to allow for a good seal, which may result in unacceptable pressure points. This is not the

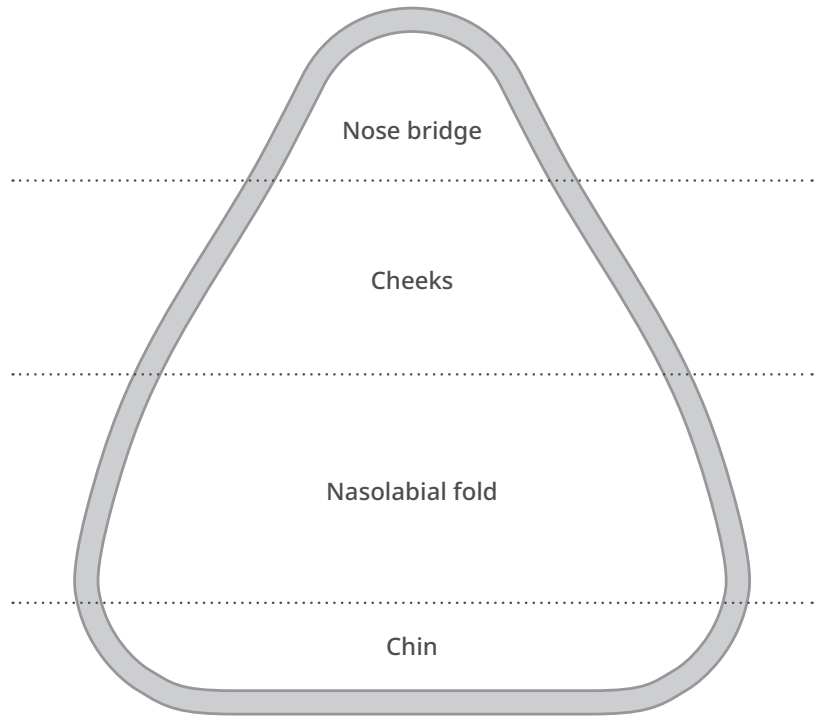
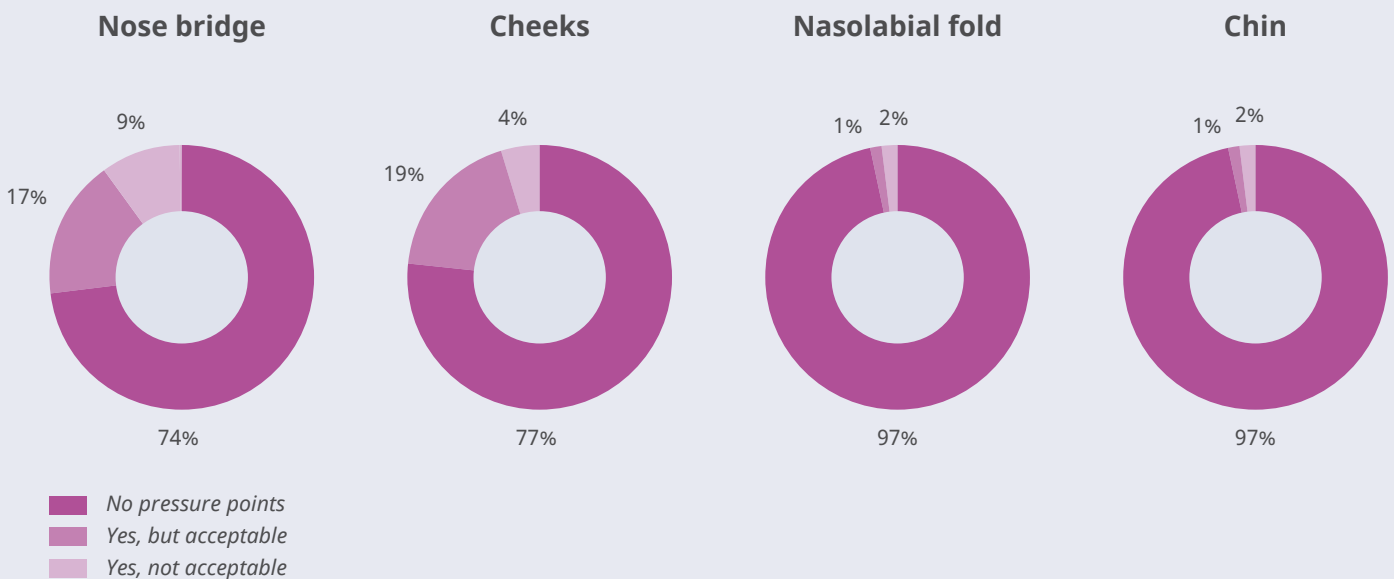


Fig. 2: Division of the four facial areas

PRESSURE POINT RESULTS



case with LENA. Well over 90% of users reported no or acceptable pressure points.

The situation is similar for leakages. 90% of users also reported no or acceptable leakages.

LENA'S FIT IS CONVINCING – EVEN AT HIGHER PRESSURE.

Higher therapy pressures are associated with higher flow. And a higher flow is usually clearly audible. For LENA – as for all masks from Löwenstein Medical – we

wanted a pleasantly quiet exhalation system at all times and optimized the flow within the exhalation gap of the vented version. The patients' confirmation of our successful development was impressive. More than 90% of patients rated the exhalation system as quiet.

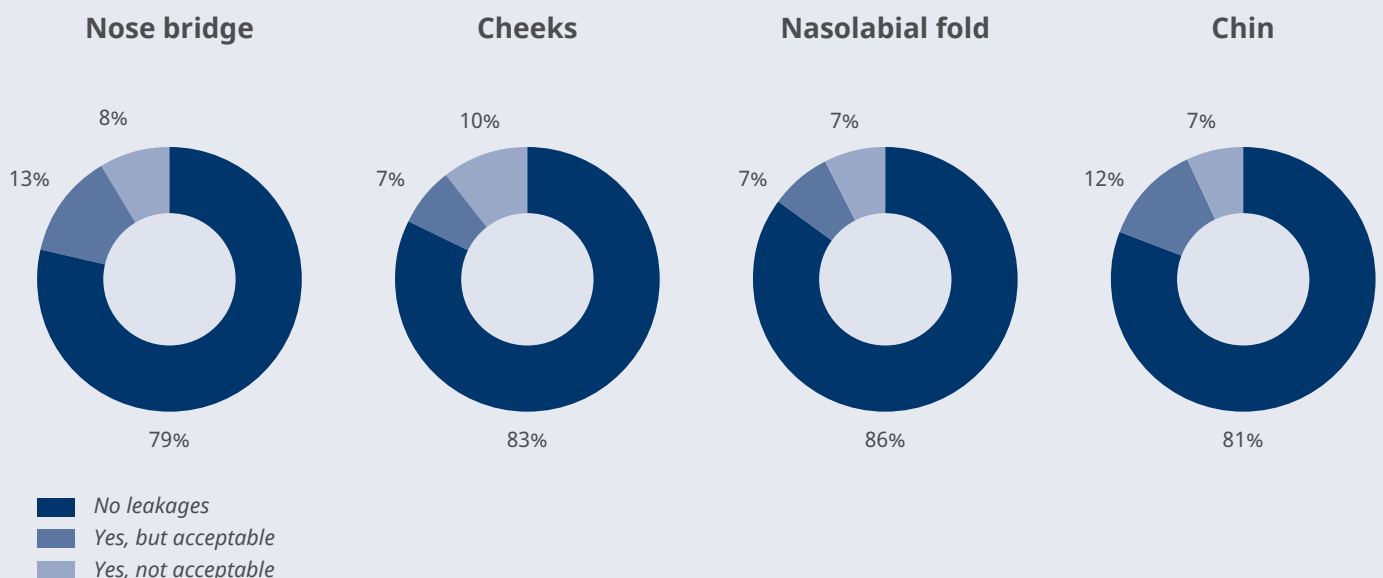
Finally, respondents had the opportunity to provide us with additional observations as free text in addition to standardized responses. This helped us to quickly recognize small "teething troubles" that we were able to analyze and eliminate immediately.

The controlled market launch has been successfully completed since the end of 2021. LENA has been put through its paces and is now available to all clients and patients. Let LENA's performance convince you too. ■



LENA. Ergonomic and beautifully designed.

LEAK RESULTS



LeoLytics.anesthesia

by Peter Kremeier

Digital Revolution in Anesthesia

After the Second World War, modern anesthesia slowly developed in Europe as well. These days, a patient-centered transfer to a transient state where surgery can be performed optimally for both patient and surgeon has become standard practice. More than 15 million anesthetics are performed every year in Germany alone, whereby each individual treatment must be documented in detail by the responsible anesthesia team at the exact time – from patient admission to surgery to postoperative care. Depending on the treatment, several hundred data records are collected and have to be archived for up to 30 years, whereby this documentation serves not only as the basis for billing and as legal proof of proper anesthesia in cases of dispute, but also as an important starting point for subsequently required anesthesia.

COVID-19 REVEALED DOCUMENTATION PROBLEMS.

The increasing desire for digitization in anesthesia is linked to the hope for greater patient safety. Among other things, this includes using artificial intelligence to continuously collect and evaluate large data volumes and generating them as artificial knowledge. This “knowledge” can support the anesthesia team in their decision-making, diagnostics, and treatment, or help to avoid human error such as patient mix-ups or the incorrect administration of drugs. The quick and easy transmission of digital data also con-

tributes to patient safety, as all relevant patient data are available at all times, eliminating the tedious search through extensive patient files under time pressure.

However, even today, more than 80% of the anesthetics performed in Germany are documented by hand.

MORE PATIENT SAFETY THROUGH DIGITIZATION.

The drawbacks have become abundantly clear, not least during the ongoing COVID-19 pandemic. These range from increased susceptibility to errors and loss of time in the documentation itself, undocumented periods during transfer from prep to the operating room, and complica-



Premedication in accordance with the individually established departmental standard.



tions in billing. Paper-based documentation can of course only be included for the evaluation and research of new therapy methods or scientific questions at great expense.

DIGITAL NETWORKING IN HOSPITALS STILL IN ITS INFANCY.

Networking in hospitals and especially in operating rooms is often still in its infancy. Ventilators, perfusors and patient monitors are rarely integrated in terms of IT technology due to the lack of available networks or expensive interface infrastructures, which makes digital storage and further data processing impossible. However, this networking would be mandatory if conventionally available digital anesthesia documentation systems were to be used in hospitals.

LeoLytics.anesthesia, the mobile digital anesthesia documentation system, provides an innovative solution that revolutionizes documentation in anesthesia and overcomes the existing hurdles.

Documentation is no longer done on paper, but on an iPad, from patient admission to discharge. All measurement data are automatically documented on the iPad and transferred to the anesthesia chart – relieving anesthetists of a significant part of their manual work.

COMMUNICATION IN THE OPERATING ROOM VIA BLUETOOTH.

The data network, which is often not available in the operating room, does not pose a problem. As a solution, LeoLytics.anesthesia was designed to establish its own communication link (via Bluetooth) to each involved, supporting anesthesia device by means of special interlinks without any further need for any IT infrastructure. Installing the system in an operating room merely takes 15 minutes.

The solution can be used on the move, treatment data can be viewed on the iPad at any time, and the anesthetist is professionally supported by hundreds of stored anesthesiological work steps, measures and activities as well as medication data and checklists.

Special emphasis was placed on intuitive usability. These days, treatment can be documented on any smartphone or tablet, either via keyboard, swiping or taking pictures. After three hours of training, every physician is able to use LeoLytics.anesthesia to document the next treatment in the OR.

PHOTOS OFFER NEW DOCUMENTATION QUALITY.

The unique ability to take photographs, whether of a patient's referral letter, their signed consent form, or their dental condition prior to intubation, provides a new critical quality in treatment documentation.

Text modules stored in LeoLytics.anesthesia and plausibility checks can help to establish a hospital's clinical documentation standard at a degree of completeness, uniformity, demonstrability and correctness unattainable on paper.

The solution is also integrated into the respective hospital network, where it stores all documented data centrally, not least to facilitate statistic evaluation. The bottom line is that hospitals benefit from optimized billing due to higher revenues, savings due to better predictability, and increased safety for patients and clinical staff.

A VERSATILE COMMUNICATION TOOL.

In the medium term, using the mobile infrastructure of LeoLytics.anesthesia offers not only the opportunity to establish a new documentation strategy, but also that of a hospital-wide information and communication strategy. As the iPads can be used not only for anesthesia documentation, but also for many other, data-privacy compliant applications for internal hospital documentation, information and communication, necessary knowledge becomes available everywhere and at any time. Going to the archives, searching for a free PC or waiting for someone to take that urgently needed call is a thing of the past.

Digitization has been in place at Frankfurt University Hospital since the beginning of 2018. LeoLytics.anesthesia is used on 150 iPads in all central and external operating and trauma

rooms by resident anesthetists. Data flow from 120 anesthesia machines to the iPads is automatic and adaptable at any time, and fully compliant with specifications from the hospital or the treating physician.

Since its implementation, approximately 80,000 anesthetics have been documented – roughly 100 million stored machine data and manual records. 100 million records that, prior to 2018, would have disappeared into an almost bottomless archive.

CONSOLIDATED KNOWLEDGE THROUGH DATA VOLUME.

If one extrapolates the findings of the University Hospital Frankfurt on the basis of 35,000 surgeries per year to 15 million anesthetics in Germany, one can guess the possibilities posed by the use of anonymized anesthesia data.

A potential also recognized by the European Union. Under the leadership of the University Hospital Frankfurt, the scientists and IT experts are developing a tool based on LeoLytics.anesthesia to monitor COVID-19 patients in intensive care units around the clock.

Each critically ill COVID-19 patient receives an iPad that records all of the patient's data around

the clock. These data are then transferred online to a central database where all COVID-19 data converge, and are analyzed with artificial intelligence (AI). The AI and machine learning programs subsequently develop predictive models that allow patient-specific predictions, such as disease progression or the best individual therapy. The database should then feed the results back to the iPad, from which the attending physician can incorporate them into treatment directly.

In addition to Löwenstein Medical and other industry partners, this also involves 14 hospitals from eleven European countries, which not only contribute their expertise but also piloted the system.

THE EUROPEAN PROJECT SCOPE.

The project was funded by the European Union and is under the auspices of the European Society of Anaesthesiology and Intensive Care (ESAIQ). First results are expected in the fourth quarter of this year.

LeoLytics.anesthesia is a barrier-free step on the way to digitized anesthesia, allowing for continuous documentation and a secure solution for more patient safety and research. ■



Quick access to all relevant data



Coexisting COPD and SDB.

by Matthias Schwaibold

The overlap syndrome. Löwenstein Medical's area of expertise.

Chronic Obstructive Pulmonary Disease and Sleep Disordered Breathing (SDB) frequently coexist. COPD is characterized by permanently inflamed and constricted airways. COPD is associated with shortness of breath, increased sputum and a cough. It leads to respiratory insufficiency and is associated with sequelae. These include cardiovascular diseases (e.g., right ventricular failure, pulmonary hypertension), respiratory infections, metabolic and sleep disorders.

7 MILLION COPD PATIENTS.

COPD is one of the most common diseases worldwide; in Germany, estimates are around 7 million affected people, with approximately 10% across the globe [Buist et al. 2007].

Sleep-related breathing disorders (SDB) are a group of conditions with repetitive pauses in breathing or decreased breathing, subdivided according to ICSD-3 into: obstructive sleep apnea (OSA), central sleep apnea (CSA), sleep-related hypoxemia, and sleep-related hypoventilation. OSA increases the risk for hypertension, cardiovascular sequelae and daytime sleepiness. Hypoxemia and hypoventilation are associated with reduced O₂ saturation, the latter also with hypercapnia (increase in partial CO₂ pressure). In a German cohort study of 1,200 patients, the prevalence for OSAs with an apnea-hypnea index (AHI) of ≥5/h was 46%, and 21% for an index ≥15/h. An AHI ≥5, in combination with an Epworth Sleepiness Scale >10, resulted in 6% [Fietze et al. 2018].

THE OVERLAP SYNDROME.

The coexistence of COPD and OSA in a patient is called overlap syndrome. Both conditions are characterized by low sleep quality, respiratory inflammation, and risk of cardiovascular sequelae. It is considered more apparent that certain COPD phenotypes and drugs used by COPD patients predispose to OSAs as well as increase nocturnal oxygen desaturation. OSA and other sleep disorders may in turn increase the risk of

acute COPD exacerbations (AE-COPD) as well as their severity [Brennan et al. 2022].

In the general population, overlap syndrome has a prevalence of approximately 1-3.6%. However, this is significantly higher in COPD and OSA patients (10-65%, depending on study results and geographic location) [McNicholas et al. 2019] [Brennan et al. 2022].

ELEVATED CARDIOVASCULAR RISK.

The mechanisms responsible for cardiovascular risk in patients with COPD (hypoxia, oxidative stress, systemic inflammation, increased activity of the sympathetic nervous system) are significantly amplified by coexisting OSA. The more severe the OSA, the more severe the course of COPD. Patients with overlap syndrome have reduced quality of life and increased mortality compared with both individual diseases [Brennan et al. 2022].

CPAP THERAPY CAN HELP.

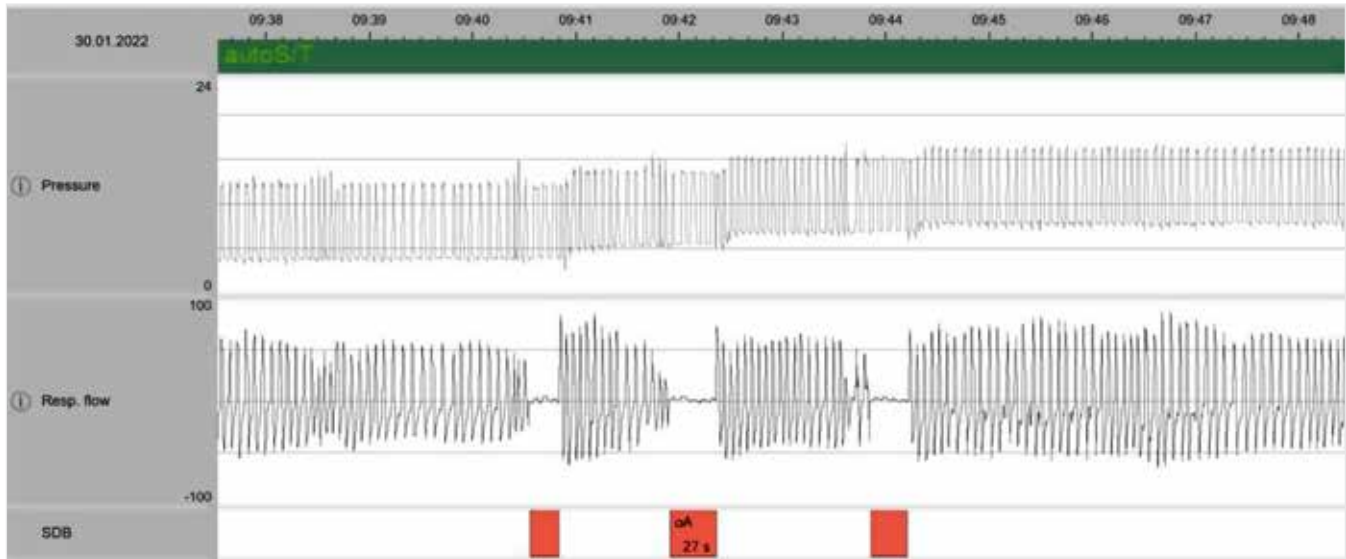
CPAP (continuous positive airway pressure) therapy for overlap syndrome delays exacerbation episodes and reduces mortality. The hospitalization rate decreases within 12 months after initiation (19.4 vs. 25.4%) [Brennan et al. 2022]. Non-invasive ventilation is recommended in progressive COPD and the occurrence of hypercapnic respiratory insufficiency, e.g., in the S2k guideline on the diagnosis and treatment of COPD and the S3 guideline of the German Sleep Society (DGSM). Under ventilation, elevated expiratory positive



Löwenstein Medical offers devices that take over both therapy and diagnosis.

airway pressure (EPAP) results in stenting the upper airway to treat OSA. Modern home ventilators also offer an automatic EPAP adjustment option (autoEPAP) to avoid having to apply a permanently increased EPAP. In addition to the known negative effects of obstructive apneas, these would otherwise also intermittently prevent mechanical ventilation.

The occurrence of obstructive apneas under ventilation cannot be detected when adjusting the ventilation settings on the alert patient. Supplementary diagnostic components such as pulse oximetry or polygraphy can be used for this purpose. Coupling diagnostic and ventilator devices is particularly helpful and enables a real-time display of poly(somno)graphical signals and pressure, flow and leakage curves from the ventilator.



Example of NIV therapy in autoST mode where upper airway obstruction occurs. Despite mandatory pressure strokes, no respiratory flow can be produced during obstructive apneas. The ventilator responds by raising the EPAP, which subsequently prevents the occlusions from occurring.

Alternatively, modern ventilators themselves provide information on the occurrence of apneas, e.g. via an AHI determined on a daily basis, which can be shown on the display or via the readout software. The visual evaluation of stored flow curves in the readout software is somewhat more time-consuming.

Through our expertise in sleep and respiratory medicine, the Löwenstein Group's homecare products offer a wide range of contemporary diagnostic and therapeutic functions in coexisting COPD and SDB to provide the best individual therapy for each patient, improving both their quality of life and medical prognosis.

Brennan, M.; McDonnell, M.J.; Walsh, S. M.; Gargoum, F.; Rutherford R.: *Review of the prevalence, pathogenesis and management of OSA-COPD overlap.* *Sleep Breath.* 2022 Jan 16. doi: 10.1007/s11325-021-02540-8. Epub ahead of print. PMID: 35034250.

Fietze, I.; Laharnar, N.; Obst, A.; Ewert, R.; Felix, S. B.; Garcia, C.; Gläser, S.; Glos, M.; Schmidt, C. O.; Stubbe, B.; Völzke, H.; Zimmermann, S.; Penzel, T.: *Prevalence and association analysis of obstructive sleep apnea with gender and age differences – Results of SHIP-Trend.* *J Sleep Res.* 2019 Oct;28(5):e12770. doi: 10.1111/jsr.12770. Epub 2018 Oct 1. PMID: 30272383.

McNicholas, W. T.; Hansson, D.; Schiza, S.; Grote, L.: *Sleep in chronic respiratory disease: COPD and hypoventilation disorders.* *Eur Respir Rev.* 2019 Sep 25;28(153): 190064. doi:10.1183/16000617.0064-2019. PMID: 31554703.

Buist, A. S.; McBurnie, M. A.; Vollmer, W. M.; Gillespie, S.; Burney, P.; Mannino, D. M. et al. (2007): *International variation in the prevalence of COPD (The BOLD Study). A population-based prevalence study.* In: *Lancet* 370 (9589), S. 741–750. DOI: 10.1016/S0140-6736(07)61377-4. ■

· Helmholtz Center in Munich, Lung Information Service.

· *International Classification of Sleep Disorders: 3rd Edition ICSD-3, 2014 of the American Academy of Sleep Medicine (AASM).*

· *S2k Guideline on the Diagnosis and Treatment of Patients with Chronic Obstructive Bronchitis and Pulmonary Emphysema (COPD): AWMF/Deutsche Gesellschaft für Pneumologie und Beatmungsmedizin e.V.*

· *S3 Guideline on Non-Restorative Sleep/Sleep Disorder Chapter "Sleep-Related Breathing Disorders in Adults" Version 2, 2017: AWMF/Deutsche Gesellschaft für Schlafforschung und Schlafmedizin (DGSM).*

Breaking new ground.

But never forgetting our roots. Löwenstein Medical has been developing and producing innovative medical technology in Bad Ems for over 30 years. Our secret?

We live by our roots.



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Research News.

by [Matthias Schwaibold](#)

We would once again like to introduce a selection of particularly worthwhile new literature below, which deals with ventilation, respiratory therapy or related diagnostics. Please feel free to give us feedback on this selection or to tell us about your own personal literary highlights.

Studies and literature on the treatment of sleep disorders and sleep apnea

A great deal of research has focused on the **link between sleep disorders and the current pandemic**. Prof. Penzel presented an international survey on this topic during the Löwenstein Medical symposium at the DGSM Congress.

RISK FACTOR FOR SYMPTOMATIC AND SEVERE COVID-19 PROGRESSION.

These and other studies show that sleep disorders and especially sleep apneas pose a risk factor for symptomatic and severe COVID-19 progression. In particular, some studies attributed this effect to nocturnal hypoxia episodes, the pro-inflammatory contribution of sleep apnea, and the relevance of undisturbed sleep to the immune system. Here is just a small selection from a large number of papers.

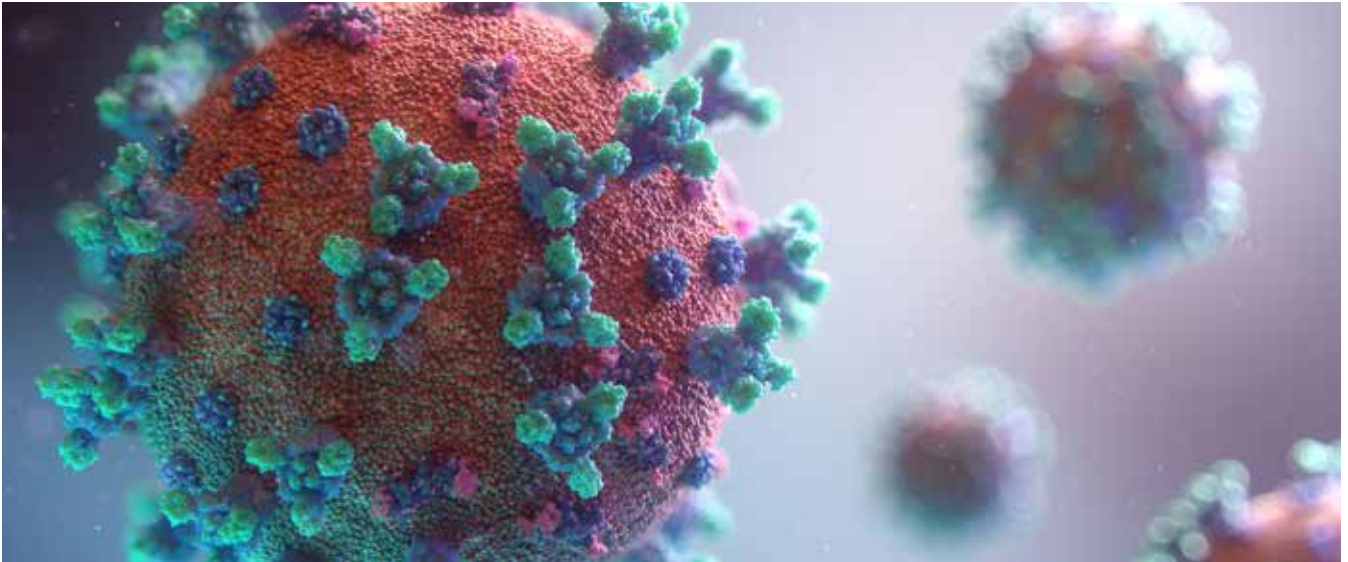
Chung, F.; Waseem, R.; Pham, C.; Penzel, T.; Han, F.; Bjorvatn, B. et al. (2021): The association between high risk of sleep apnea, comorbidities, and risk of COVID-19. A population-based international harmonized study. In: Sleep & breathing 25 (2021), S. 849–860. DOI: 10.1007/s11325-021-02373-5.

Pena Orbea, C.; Wang, L.; Shah, V.; Jehi, L.; Milinovich, A.; Foldvary-Schaefer, N. et al. (2021): Association of Sleep-Related Hypoxia with Risk of COVID-19 Hospitalizations and Mortality in a Large Integrated Health System. In: JAMA Network Open 4 (11). DOI: 10.1001/jamanetworkopen.2021.34241.

Bellou, V.; Tzoulaki, I.; van Smeden, M.; Moons, K.G.M.; Evangelou, E.; Belbasis, L. (2021): Prognostic factors for adverse outcomes in patients with COVID-19. A field-wide systematic review and meta-analysis. In: Eur. Respir. J. DOI: 10.1183/13993003.02964-2020.

Hariyanto, T. I.; Kurniawan, A. (2021): Obstructive sleep apnea (OSA) and outcomes from coronavirus disease 2019 (COVID-19) pneumonia. A systematic review and meta-analysis. In: Sleep Med 82, S. 47–53. DOI: 10.1016/j.sleep.2021.03.029.

Beltramo, G.; Cottenet, J.; Mariet, A.-S.; Georges, M.; Piroth, L.; Tubert-Bitter, P. et al. (2021): Chronic respiratory diseases are predictors of severe outcome in COVID-19 hospitalised patients. A nationwide study. In: Eur. Respir. J 58 (6). DOI: 10.1183/13993003.04474-2020.



The COVID-19 virus.

CORRELATIONS BETWEEN COVID-19 AND SLEEP DISORDERS.

A narrative review presents the correlations identified to date between COVID-19 and sleep disorders in general. OSA is confirmed as a risk factor for severe COVID-19 progression. The significant impact of COVID-19 disorders including their accompanying circumstances on sleep quality, fatigue, anxiety disorders, stress, quality of life, etc. will also be highlighted.

Pataka, A.; Kotoulas, S.; Sakka, E.; Katsaounou, P.; Pappa, S. (2021): Sleep dysfunction in covid-19 patients. Prevalence, risk factors, mechanisms, and management. In: Journal of Personalized Medicine 11 (11). DOI: 10.3390/jpm11111203.

CPAP THERAPY FOR CHRONIC FATIGUE SECONDARY TO COVID-19.

According to some cases in a case report publication, sleep apnea was diagnosed as part of treatment for chronic fatigue caused by COVID-19 and this chronic fatigue was resolved with CPAP therapy.

Koczulla, A. R.; Stegemann, A.; Gloeckl, R.; Winterkamp, S.; Sczepanski, B.; Boeselt, T. et al. (2021): Newly detected rapid eye movement associated sleep apnea after coronavirus disease 2019 as a possible cause for chronic fatigue. Two case reports. In: J. Med. Case Rep. 15 (1). DOI: 10.1186/s13256-021-02819-0.

RESIDUAL DAYTIME SLEEPINESS UNDER CPAP THERAPY.

Several publications dealt with **residual daytime sleepiness under CPAP therapy**. From the ESADA database, it was determined that approximately ¼ of CPAP users are affected, although the proportion varied greatly between the participating European countries. The frequency of residual daytime sleepiness continued to decrease several months after therapy initiation and correlated with baseline daytime sleepiness and CPAP use duration, but only slightly. Controlled randomized trials demonstrate the efficacy of adjunctive drug therapy in these patients. Several **review articles** on this topic also emphasize the relevance and association with low CPAP use, increased residual AHI, co-morbidities, greatly increased baseline daytime sleepiness, younger age, and still quite short duration since CPAP initiation. **Decision-making and treatment recommendations** are provided, including for adjunctive drug therapy.

Bonsignore, M. R.; Pepin, J. L.; Cibella, F.; Barbera, C. D.; Marrone, O.; Verbraecken, J. et al. (2021): Excessive Daytime Sleepiness in Obstructive Sleep Apnea Patients Treated With Continuous Positive Airway Pressure. Data From the European Sleep Apnea Database. In: Frontiers in Neurology 12. DOI: 10.3389/fneur.2021.690008.

Pépin, J.-L.; Georgiev, O.; Tiholov, R.; Attali, V.; Verbraecken, J.; Buyse, B. et al. (2021): Pitolisant for Residual Excessive Daytime Sleepiness in OSA Patients Adhering to CPAP. A Randomized Trial. In: *Chest* 159 (4), S. 1598–1609. DOI: 10.1016/j.chest.2020.09.281.

Schweitzer, P. K.; Mayer, G.; Rosenberg, R.; Malhotra, A.; Zammit, G. K.; Gotfried, M. et al. (2021): Randomized Controlled Trial of Solriamfetol for Excessive Daytime Sleepiness in OSA. An Analysis of Subgroups Adherent or Nonadherent to OSA Treatment. In: *Chest* 160 (1), S. 307–318. DOI: 10.1016/j.chest.2021.02.033.

Fietze, I.; Blum, H.-C.; Grüger, H.; Käßner, F.; Maurer, J. T.; Nilius, G. et al. (2021): Diagnosis and treatment of residual sleepiness in patients with treated obstructive sleep apnea. In: *Somnologie* 25 (2), S. 99–109. DOI: 10.1007/s11818-021-00305-9.

Mehra, R.; Heinzer, R.; Castillo, P. (2021): Current Management of Residual Excessive Daytime Sleepiness Due to Obstructive Sleep Apnea. Insights for Optimizing Patient Outcomes. In: *Neurology and Therapy* 10 (2), S. 651–672. DOI: 10.1007/s40120-021-00289-6.

Rosenberg, R.; Schweitzer, P. K.; Steier, J.; Pepin, J.-L. (2021): Residual excessive daytime sleepiness in patients treated for obstructive sleep apnea. Guidance for assessment, diagnosis, and management. In: *Postgraduate Medicine* 133 (7), S. 772–783. DOI: 10.1080/00325481.2021.1948305.

SLEEP MEDICINE IN CARDIOLOGY.

A revised edition of the “**Position paper “Sleep medicine in cardiology”**” summarizes the current evidence on the association of sleep disorders and cardiovascular disease, specifically arterial hypertension, pulmonary hypertension, coronary artery disease and myocardial infarction, stroke, cardiac arrhythmias, and heart failure. Recommendations are given on the approach to diagnosis and therapy with their respective levels of evidence. CPAP therapy is therefore recommended for symptomatic OSA with arterial hypertension, among other conditions.

Fox, H.; Arzt, M.; Bergmann, M. W.; Bitter, T.; Linz, D.; Oldenburg, O. et al. (2021): Position paper “sleep

medicine in cardiology”, update 2021. In: *Kardiologie* 15 (5), S. 429–461. DOI: 10.1007/s12181-021-00506-4.

A DIAGNOSIS WITH PERSPECTIVE.

As a new aspect of sleep medicine in cardiology, recent publications report the potential to tele-medically monitor **episodes of periodic breathing occurring** in PAP patients and **to use this to detect the occurrence of relevant** cardiovascular events.

Prigent, A.; Pellen, C.; Texereau, J.; Bailly, S.; Coquerel, N.; Gervais, R. et al. (2021): CPAP telemonitoring can track Cheyne–Stokes respiration and detect serious cardiac events. The AlertApnée Study. In: *Respirology*. DOI: 10.1111/resp.14192.

Saito, K.; Takamatsu, Y. (2021): Periodic breathing in patients with stable obstructive sleep apnea on long-term continuous positive airway pressure treatment. A retrospective study using CPAP remote monitoring data. In: *Sleep & breathing = Schlaf & Atmung*. DOI: 10.1007/s11325-021-02510-0.



Breathe in, breathe out.

Studies and literature on ventilation

A working group selected and summarized particularly relevant **intensive care studies from 2020/2021** with a focus on ventilation, oxygen therapy, and weaning. Topics of the selected studies:

- Use of non-invasive ventilation strategies, emphasis: Comparison of different interfaces in acute ventilation of COVID-19 patients.
- Intubation and use of invasive ventilation strategies, with a critical appraisal of their use in COVID-19.
- Application of oxygen in critically ill patients with hypoxic respiratory insufficiency, with indications of equivalence to conservative oxygenation.
- Drug therapy approaches for ARDS, including corticosteroids.
- Extracorporeal membrane oxygenation.

In summary, lung-protective ventilation with low tidal volume, avoidance of barotrauma, a conservative fluid strategy, and prone ventilation are recommended for COVID-19 pneumonia; supplemented as needed with inhaled pulmonary vasodilators and neuromuscular blockade and “as needed” venovenous ECMO therapy.

Fiedler, M. O.; Reuß, C. J.; Bernhard, M.; Beynon, C.; Hecker, A.; Jungk, C. et al. (2021): Focus ventilation, oxygen therapy and weaning. Intensive medical care studies from 2020/2021. In: Anaesthesist 70 (11), S. 967–976. DOI: 10.1007/s00101-021-00979-8.

CLINICAL PRACTICE GUIDELINE FOR ACUTE RESPIRATORY DISTRESS SYNDROME.

The European Respiratory Society (ERS) has published a **Clinical practice guideline for acute respiratory distress syndrome (ARDS)**. In particular, conventional oxygen therapy, high-flow nasal cannula and non-invasive ventilation are comparatively prioritized depending on the specific clinical situation. Eight common clinical situations are differentiated.

Oczkowski, S.; Ergan, B.; Bos, L.; Chatwin, M.; Ferrer, M.; Gregoretti, C. et al. (2021): ERS Clinical Practice Guidelines. High-flow nasal cannula in acute respiratory failure. In: Eur. Respir. J. DOI: 10.1183/13993003.01574-2021.

NASAL OR ORONASAL MASKS FOR NON-INVASIVE VENTILATION.

Regarding the question of the better suitability of **nasal or oronasal (“full-face”) masks for non-invasive ventilation**, there have been very few controlled randomized trials to date, and the validity of observational studies is limited due to selection bias. Now, both a new randomized controlled trial and a review of previous randomized controlled trials (RCTs) on this topic have appeared. Both demonstrate that neither of the masks exhibit any general superiority. This means that the decision can and should be made individually for each patient based on the effectiveness of ventilation, acceptability, and any side effects such as dry mouth, mask leakage, pressure sores, upper airway obstruction, pressure requirements, etc.

Majorski, D. S.; Callegari, J. C.; Schwarz, S. B.; Magnet, F. S.; Majorski, R.; Storre, J. H. et al. (2021): Oronasal versus nasal masks for non-invasive ventilation in copd. A randomized crossover trial. In: International journal of chronic obstructive pulmonary disease 16, S. 771–781. DOI: 10.2147/COPD.S289755.

Lebret, M.; Léotard, A.; Pépin, J. L.; Windisch, W.; Ekernkamp, E.; Pallero, M. et al. (2021): Nasal versus oronasal masks for home non-invasive ventilation in patients with chronic hypercapnia. A systematic review and individual participant data meta-analysis. In: Thorax 76 (11), S. 1108–1116. DOI: 10.1136/thoraxjnl-2020-215613. ■

*Löwenstein
designer Anne
Wonsyld is pleased
to receive so much
recognition.*



**GERMAN
DESIGN
AWARD
2022**



GERMAN
DESIGN
AWARD
2022

GERMAN
DESIGN
AWARD
2022

LUIZA Design Award.

by [Anne Wonsyld](#)

And the winner is: LUIZA.

This year, LUIZA has received yet another distinction – the German Design Award 2022.

For our life-supporting home ventilator LUIZA, this is already the fourth prize in product design. In 2021, and in addition to the Red Dot and IF Award, which are probably the best-known international prizes, LUIZA was also able to convince at the Baden-Württemberg Design Award – the Focus Open – and go for Gold.

AN AWARD THAT FURTHER SPURS US ON TO COMBINE EXCELLENT DESIGN WITH TOP TECHNOLOGY.

In order to avoid operating errors and optimize ergonomics, we developed LUIZA with the user in mind right from the start. Intuitive operation simplifies handling for all user groups: patients, family members, caregivers and therapists.

However, the esthetics of a product must not be neglected in any way. With its compact and slim design, LUIZA blends in perfectly with the home environment. Because its design is more remi-

niscient of “consumer electronic devices” than medical devices, it helps reduce the patient's fear of stigma and therefore improves quality of life. The technically complex ventilator is elegantly and deliberately concealed by the design.

AS LUIZA IS EASY TO OPERATE, IT CREATES A FEELING OF SECURITY.

The annually bestowed German Design Award is one of the most important national design competitions. A jury of international experts honors design trends in product and communication design that are groundbreaking in the international design landscape.

These awards confirm that our products are not only well thought-out and innovative, but also meet the highest design standards. For us, this means both recognition and incentive.

WE CREATE DESIGN THAT INSPIRES!

What are these large tanks?

When Löwenstein Medical launched its liquid oxygen business in January 2008, no one could have imagined the dimensions that the newly established division would adopt.

The first deliveries were filled centrally from just one of the 19 oxygen tanks, which had a capacity of up to 50,000 liters of liquid oxygen and are now installed nationwide. Our patients receive their oxygen deliveries Monday through Friday, even on holidays. This is ensured by dozens of trips throughout Germany, delivering tens of thousands of liters of liquid oxygen every day after covering a distance of approximately 25,000 km [some 15,534 miles].

For the oxygen drivers, it must also have been an extraordinary job to deliver the oxygen to our patients at a temperature of -183°C [-297°F]. 1 liter of compressed liquid oxygen provides the patient with 850 liters of gaseous oxygen, allowing us to supply the patients at fixed, plannable

They are impossible to miss. And they are vitally important.



intervals and giving them the security of being supplied with sufficient oxygen at all times. However, the supply of concentrators, whether stationary or mobile, is also part of the range of products supplied by the Oxygen Business Unit and has meanwhile assumed a significant magnitude.

Extremely cold. The vehicles refuel oxygen with a temperature of $-183\text{ }^{\circ}\text{C}$ for transport to the patient.



Something our oxygen experts have been assisting with for a very long time. And they know their patients well.



Oxygen therapy helps to lead a relatively autonomous life.

OXYGEN LOGISTICS. A DAILY CHALLENGE.

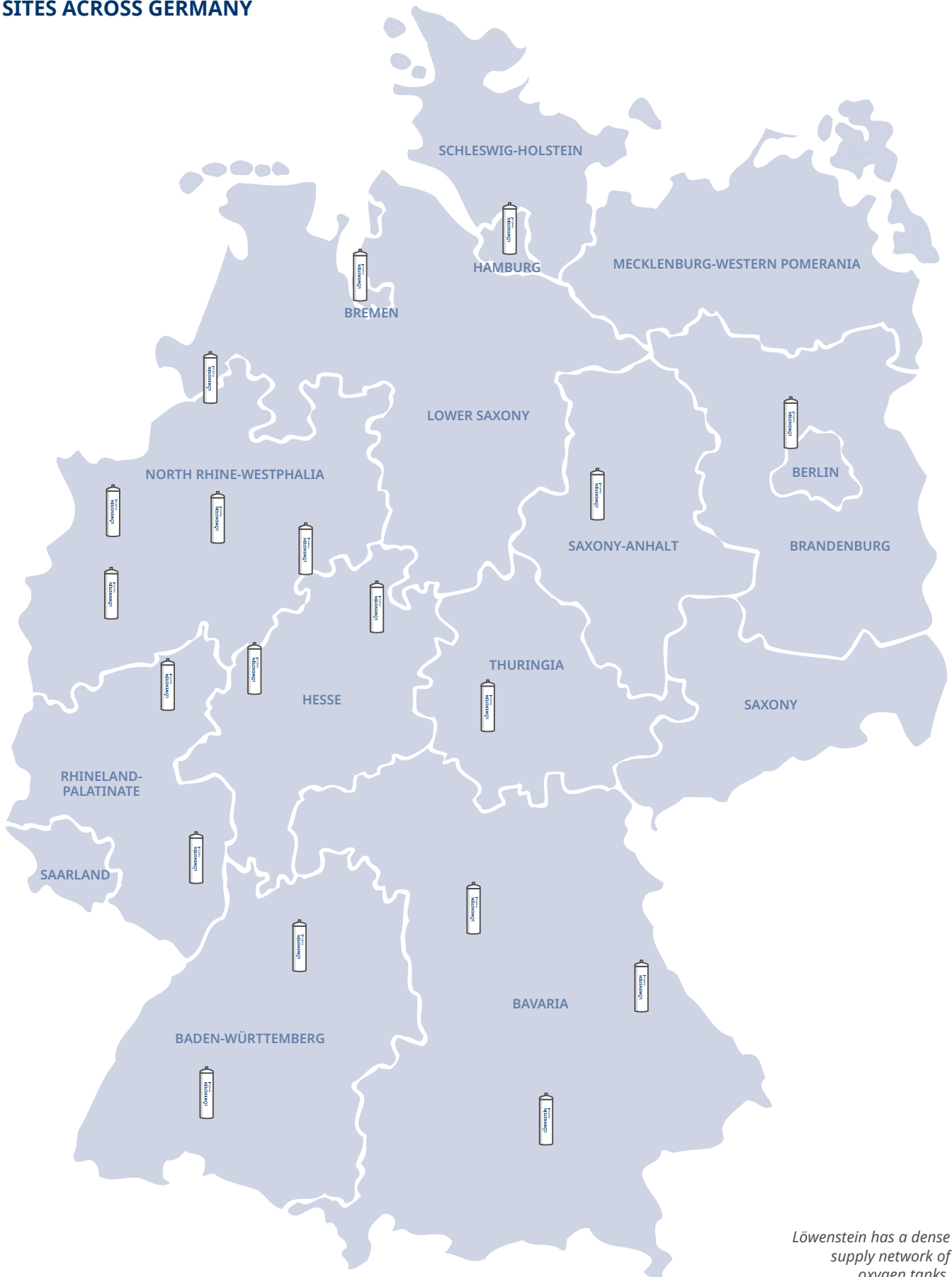
However, patients with low oxygen levels are not the only ones we can help. For example, a special form of headache known as “cluster headache” can also be treated with oxygen. A medically prescribed “oxygen insufflation” in the high flow range can help to relieve pain.

Every day, the 220 employees of the business unit are faced with new exciting challenges, which we are happy to take on.

For instance, in the course of the ongoing pandemic we were repeatedly able to contribute to supporting hotspot areas and to help our patients through their infection. ■

19

LIQUID OXYGEN SITES ACROSS GERMANY



Löwenstein has a dense supply network of oxygen tanks.

breath e

difference

Sustainability is a question of corporate morality.

As a German family-owned company, sustainability is a keyword for the future for Löwenstein Medical.

SUCCESS AND PURPOSE. THE LÖWENSTEIN PHILOSOPHY.

Success is always a question of responsibility, both in the economic and in the ecological and social sense. Löwenstein Medical is convinced that this responsibility must be lived and translated into actions to secure a good and safe future for everyone.

COMMITTED TO PEOPLE.

Löwenstein Medical is a direct provider to more than 600,000 homecare patients and operates in 130 countries across the globe. From this perspective alone, there is no question that we accept the daily challenge to positively develop the future of our society and our environment.

LOGISTICS IS ONE BUILDING BLOCK.

Part of our production strategy is to keep transport routes as short as possible and to use resources sparingly. Over 90% of ventilators are made of German parts and 100% of home ventilators are manufactured in Hamburg. This keeps



Löwenstein focuses on sensible packaging concepts.

supply chains short and economic redundancies rare. A real advantage for the environment. In addition, Löwenstein Medical sites are deliberately chosen so that they are within easy reach of the public transport network. To reduce CO₂ emissions even further, we have recently started offering employees the option of leasing e-bikes.

INDEPENDENCE CREATES FREEDOM.

As most of the company buildings, offices and production facilities are owned by Löwenstein Medical, we are able to implement power saving measures consistently. Motion sensors for lights, the use of energy saving bulbs and the installation of solar panels are just a few examples. New buildings, such as Steinbach/Taunus, are planned and implemented with effective energy management; this includes construction measures such as triple

glazing, wastewater treatment and ecological building insulation. Energy saving measures are also being implemented in the other industrial buildings, offices and the SchlafAtemZentren [SleepBreathCenters].

AVOIDING WASTE IS RECYCLING 2.0.

Why create waste that is expensive and consumes a lot of energy to recycle in the first place? Löwenstein Medical relies on the economical use of materials, device parts and their multiple application within the framework of regulatory requirements and options.

Our engineers and developers are already thinking about the disposal of the devices while they are being produced. For example, we have said goodbye to adhesive joints and are using screw-connected parts, which makes recycling much easier. Product material consumption

is also reduced by using flow sensors, paramagnetic O₂ cells, or replacing batteries only when necessary.

Of course, packaging is also part of our savings strategy. We are happy to have our ecological goals, such as meeting recycling quotas and developing more sustainable packaging, monitored transparently and in legally compliant manner by the central packaging registry. We consider the environmentally compatible disposal of equipment packaging with which we supply our 600,000 patients as both a service and an obligation. Our health advisors are happy to become messengers for a healthy environment and centrally collect packaging waste at Löwenstein sites, where it is recycled or disposed of in accordance with the "Green Dot" regulations.

THE SUPPLY CHAIN DUE DILIGENCE ACT.

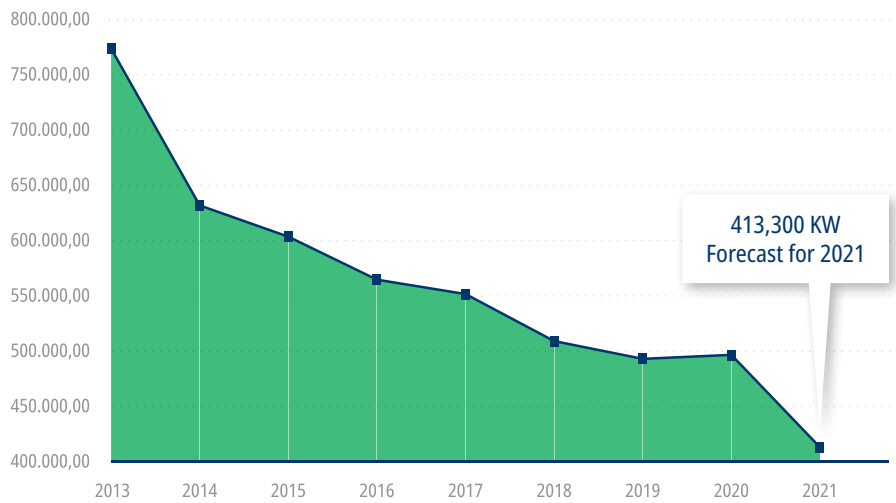
What does this mean? It obliges companies to ensure respect for human rights and environmental agreements along their own supply chains. This includes not only our own entrepreneurial actions, but also the behavior of suppliers and service partners. Any violations are met with heavy fines. For Löwenstein Medical, this law has long been an implicit part of our corporate philosophy. In view of the statutory introduction of the new law, we have also been working on formally implementing the standards for several months now. We welcome it unequivocally and are setting all courses to become even better, more sustainable, more humane.

LEAVE IT TO THE PROFESSIONALS.

We know what we are good at. As our ventilation technology is leading-edge, we are also looking for top professionals for our ecological management. Especially when it comes to recycling e-waste and batteries. We care for the environment and our society by ensuring

CONSTANTLY SAVING ENERGY

Energy consumption values



Energy consumption diagram 2013–2021.

that our energy suppliers provide all our consumption points with 100% green power sourced from regional providers.

A GLANCE AT THE FUTURE.

The expansion of renewable energies is at the forefront of Löwenstein Medical's sustainability program. By 2024, the expansion of photovoltaic systems is expected to add another 60–80 kWp of installation capacity with an annual gener-

ation capacity of approximately 50–60,000 KW and a savings of 25 t of CO₂ availability.

TO SEE IS TO ACT.

Sustainability is part of our corporate DNA. We work, research and produce to improve quality of life and to save lives. How then could we leave the big questions of our global future unanswered?

AND TO SEE IS TO BELIEVE.

You are cordially invited to visit one of our production sites in Hamburg, Kronberg/Taunus, Neuhäusel or Bad Ems to get a fist-hand impression of how we implement our actions for sustainability and corporate social responsibility. You are also welcome to visit our new, energy-efficient and resource-saving production site in Steinbach/Taunus. ■



Ecology and economy go well together when it comes to material savings.

Technical Training goes digital.

by [Armin Hegeler](#)

Our high standards encompass not only the quality of our products, but also our technical training. This applies not only to classroom but also to online training.



Our mobile studio can be used worldwide.

Planned long in advance and implemented at full speed while faced with the challenges of pandemic – technical training at Löwenstein Medical at the Hamburg site in digital form.

MOBILE STUDIO IN A TRANSPORT CASE

Our high standards encompass not only the quality of our products, but also our technical training. This applies not only to classroom training but also to its digital form.

Against this backdrop, we have recently refined and implemented the concepts for high-quality online training that were already developed before the pandemic. To create the appropriate framework conditions, we also planned and implemented a mobile studio. The studio is based on a

transport case containing a mobile workstation equipped with the appropriate technology for our purposes. In addition to a screen, this also includes 2-camera technology, which makes it possible to alternately capture the trainer and the workplace. This lets the participant see all the work steps in detail during the practical part. At the same time, the trainer can convey theoretical knowledge to the training participant in the form of a personal approach. Basically, the format is focused on the practical part, i.e. the client personally works on the device during the training session.

The studio also includes all the tools and testing equipment required for training, so that the training courses do not require much preparation time.

In May 2020, we started the first online training sessions and used the studio for the first time in September. Since mid-October, we have been conducting training almost every week and almost daily.

WORLDWIDE TRAINING.

Participants are clients or service partners from across the globe, with a focus on clients outside Europe. The number of participants per training session is 1- 4 persons (current average just under 3 participants). In total, we have trained about 50 technicians over the last few months, partly as a refresher course and partly as initial training.

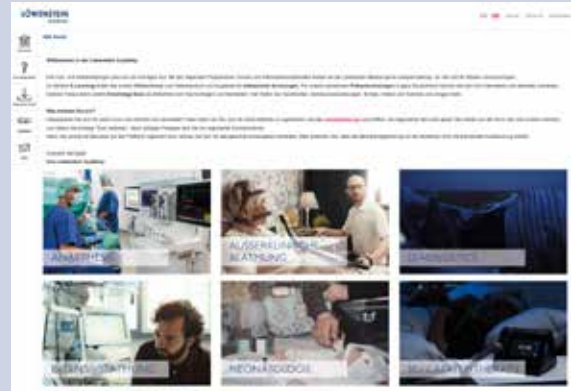
Without exception, the feedback we received from our clients and training participants is extremely positive, and the training format is considered to be LMT's accustomed high level of professionalism.

Online training has therefore quickly become an integral part of our training offers and is another important step towards digitization.

If you have any questions about this or would like to set up something similar, please feel free to contact Christian Möwius, who was instrumental in supervising and implementing the project.

| academy |

THE LÖWENSTEIN MEDICAL ACADEMY HAS LONG BEEN AN INTEGRAL PART OF OUR SERVICE PHILOSOPHY.



Go to our website to book appointments and contacts at any time.

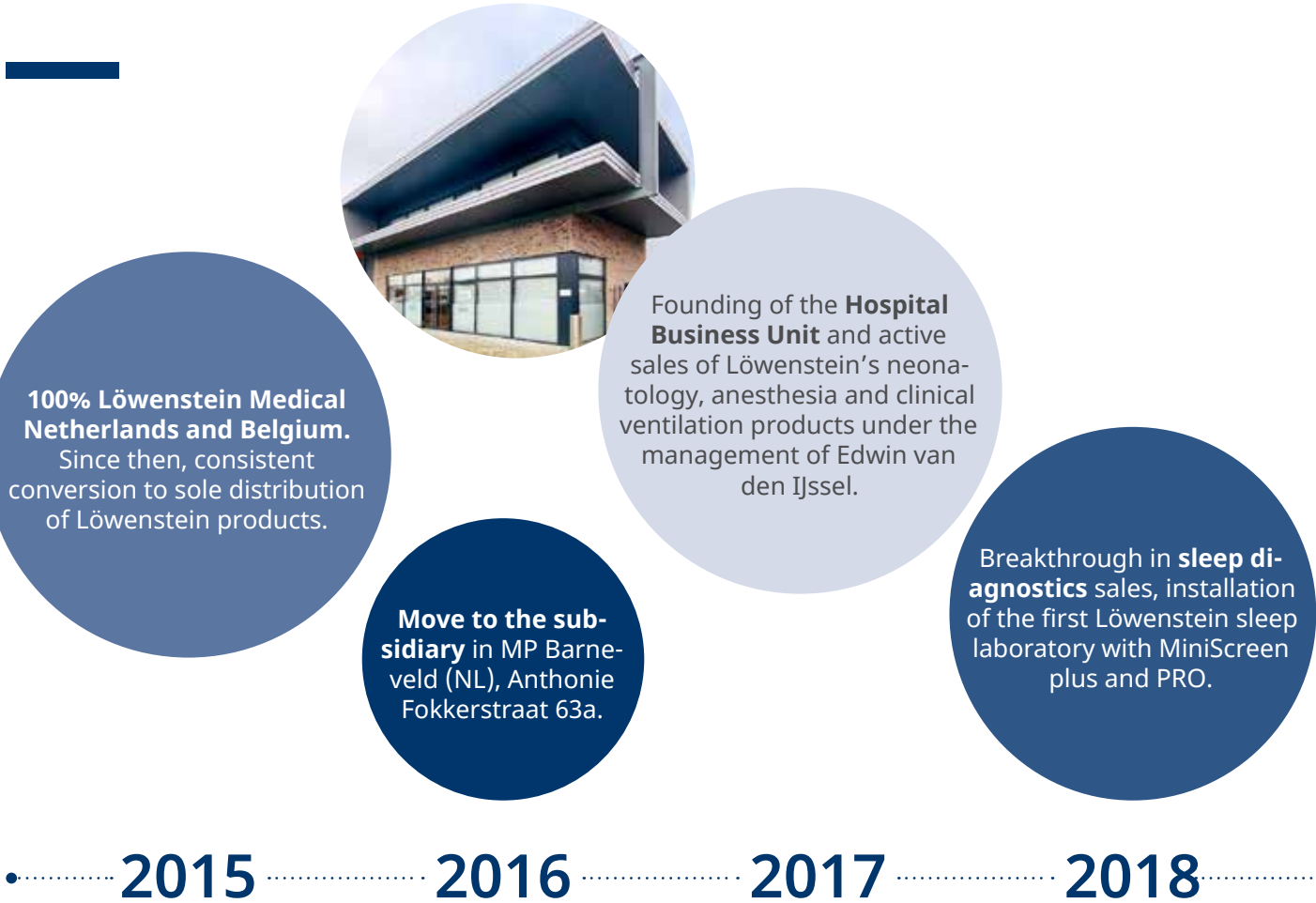
Being as close as possible to the everyday lives of our clients, patients, partners, friends also means not relying on our products alone. We accompany, help, teach, mediate, discuss or simply talk, person to person, whenever there are problems. We look for solutions together and explain complex technical issues in simple and user-oriented manner.

The Academy had already adapted to the requirements of e-learning and on-line training years ago. Maximum information while investing a minimum amount of time. And we even go one step further. Triggered by the pandemic, Löwenstein Medical launched the "Digital Academy". We would be happy to tell you a little more about this.



Löwenstein Medical Netherlands – a portrait.

by Dirk Doetkotte



The team at Löwenstein Medical Netherlands.

Since the subsidiary was founded in 2015, the team around Dirk Doetkotte has grown steadily and now has ten employees. The team provides on-site support for the Hospital, Diagnostics and Homecare business units and distributes Löwenstein products from the three abovementioned divisions.

In recent years, colleagues have been able to build up numerous resuscitation and warming units



Breakthrough in **clinical ventilation** sales with the elisa product line.

Establishment of the **Diagnostics and Homecare business unit** under the management of Piet-Hein van Saeftinghe. Active sales of Löwenstein products in sleep diagnostics and support of specialized trade partners in the Netherlands for sleep therapy and outpatient ventilation.

Division of Löwenstein Medical Netherlands and Löwenstein Medical Belgium into two independent companies.

2019

2020

2021 →

Pediatrics Lifetherm, the MR-capable anesthesia systems Leon MRI, anesthesia systems Leon, neonatal ventilation systems Leoni, clinical ventilation systems of the elisa family, prisma VENT50-C and first sales of prisma CPAP and BiPAP devices including prisma CLOUD in their retail structure with connections and MiniScreen.

The Barneveld office serves clients from Amsterdam, Utrecht, Beverwijk, Capelle, The Hague, Helmond, Rotterdam, Uden, Deventer, Venray, Venlo, Winterswijk, Delft, Enschede, Nieuwegein, Dordrecht, Gorinchen, Gouda and, interestingly, the Dutch Caribbean islands. ■



That's what you call teamwork. Even during a BBQ.

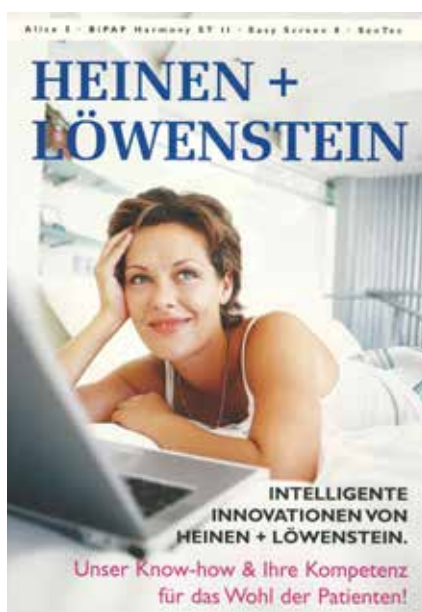
Inspiration. A magazine with history.

by Julia Buscher

Everything is in flux. Everything changes. Everything is characterized by new technologies and media. And Löwenstein Medical, as a leading medtech company, is committed to keeping up with these innovations and trends, even staying a little step ahead. This philosophy is also reflected in our corporate magazine Inspiration. Join us on a short trip through time in print.



Heinen + Löwenstein format, 2000.



Heinen + Löwenstein, 2002.



emser depesche, 2004.



emser depesche, 2008.



Löwenstein medical Magazine, 2018.



Inspiration, 2021.

Just like Löwenstein Medical, the company's own magazine has changed and evolved over the years. However, the magazine's objective of informing patients, clients, employees and company friends about current medical technology topics and about the company itself has remained the same.

The magazine, which was initially known as "format" and "emser depesche", has developed into a kind of informative "business card" for the Group, uniting all divisions and all individual companies.

The project was launched in 2000 under the name "format" as a customer magazine for Heinen + Löwenstein. This client magazine helped to create

a means of communication to report on news, changes, information and developments and to give clients an insight into the company.

THE TOPICS.

Over the years, the magazine covered many exciting topics such as the construction of the company's headquarters in 2000, a visit from the Prime Minister Kurt Beck in 2010, a look back at 25 years of company history in 2011, or the presentation of various locations and new product lines.

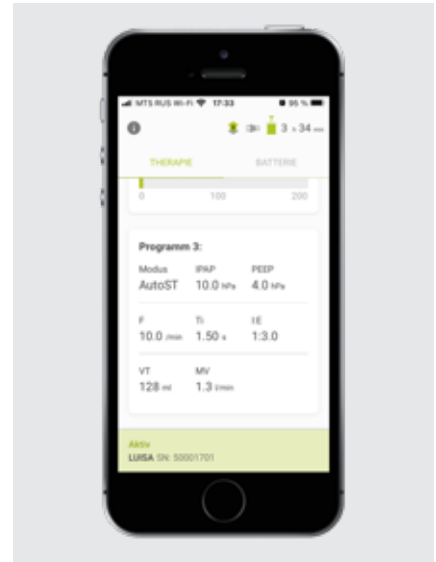
Since 2018, the magazine has been published under the name "Löwenstein Medical Magazine" in various languages with the help of many authors from the group of companies. This allows us to combine all

company divisions in one magazine.

THE LATEST ADJUSTMENTS.

In the course of increasing internationalization, the magazine was once again adapted and renamed in 2020. The new name "Inspiration" should be easy to understand in both German and English. The English word "inspiration" can be translated in different ways and can therefore signify a creative thought or an illuminating idea or the medical term "inhalation". The layout was also adapted to a uniform corporate design in the course of internationalization. Despite all the changes in recent years, the magazine's foundation, idea and goal have always been maintained. ■

Have you heard?



Opening of new sites

NEW BRANCHES.

Last year, we continued to invest in the expansion of our German sites. For example, some 12 new Sleep-Respiratory-Centers have opened since the beginning of 2021. The new sites mean that we can now be even closer to our patients and clients and expand our local service. ■

Happy Birthday!

OUR ONLINESHOP TURNS 4.

Our online store turned four years old on 04/21/2022. On this occasion, here are some insights: Since 04/21/2018, 19,700 customers have visited the shop and placed an average of 2.5 orders. This means we were able to process approximately 21,000 orders in 2021. Among the 388 items, the most popular were our Löwosan, our cleaning cloths and our fine filters. Why not have a browse under: www.loewenstein.shop ■

The LUISA app

AVAILABLE NOW!

With the LUISA app, you can keep an eye on ventilation at all times, allowing you to view the entire ventilation situation and useful device information at any time. The app therefore offers simple and helpful therapy support in German, English or French and is available for both the iOS and Android operating systems. ■

In the category “Have you heard?” we present interesting facts in a nutshell on many different topics all around the Group.



Trade fairs & congresses

AT LAST, HERE WE GO AGAIN. The first events in Germany now took place after almost 2 years without being able to attend trade fairs and congresses in person. This meant that colleagues were finally able to get back in touch with clients on site and make new contacts. The first major congresses were the GNPI in Aachen and the DIGAB in Münster. Both congresses were a complete success! ■

It's time to retire!

EVERYTHING OF THE BEST! Löwenstein Medical bid farewell to Ms. **Regina Bilo** and Mr. **Ansgar Bilo**, who will retire on March 31, 2022. After more than 30 years with the company, both will continue to support the company in an advisory capacity for some time to oversee and bring projects to a successful conclusion. The Löwenstein family and the entire Löwenstein Medical team would like to thank them for the many years together and wish them all the best on their retirement! ■

International Sales

REALIGNED. The Hospital Division has now been combined globally under the management of Mr. Christoph Vetter. Martin Liebel takes over responsibility as Global Key Account Manager. In addition, the Homecare business in Europe is now coordinated by Andreas Bosch. A Head of International Sales is sought for all other regions of the world. ■



The Ukraine crisis

HELP DURING DIFFICULT TIMES.

Due to the current crisis situation in Ukraine, some people from Löwenstein did not think twice and quickly offered their help. The employees collected donations in kind and money, which were used to purchase urgently needed relief supplies, and brought them to the border. They also helped move mothers and their children to safe shelters. Löwenstein Medical participated in the campaigns by donating funds, providing vehicles and fuel, and helping to house refugees. ■



WILAflow elite

NEW TO THE PROGRAM.

The WILAflow elite is a new, non-invasive ventilator on the market, and is intended for premature and newborn infants. The device from our subsidiary WILAméd offers optimal and advanced care for our smallest and most sensitive patients. ■



The Ventura mask

NEW TO THE PROGRAM.

At home, in hospitals and other healthcare facilities, the Ventura mask can be used in conjunction with mechanical ventilation. This is a full face mask for our adult patients. ■

PesoCath

To ensure that lung protection is more than just a phrase.



WIRE-IN-WIRE SYSTEM

Easy withdrawal of the insertion wire due to wire-in-wire solution and special coating.



SIMPLY SAFE IN EMERGENCY SITUATIONS

A direct channel for emergency aspiration, auscultation and gastric drainage.



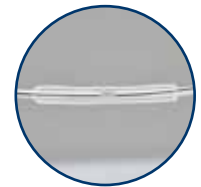
ENTERAL NUTRITION IN ACCORDANCE WITH THE LATEST STANDARD

Direct connection to the new standard for DIN EN ISO 80369 connectors with practical locking crown.



VENTILATOR INTERFACE

A port for esophageal and transpulmonary pressure monitoring or position-dependent for gastric pressure.



ESOPHAGEAL BALLOON

The special esophageal balloon provides outstanding responsiveness to abrupt pressure changes and is designed for the dynamic requirements of transpulmonary pressure measurement.



With people in mind



How about a day at the beach?
With Luisa and Bianca.



loewensteinmedical.com

