

# Decentralized chlorine production for water treatment and infection prevention and control:

A Global Community of Practice

## Background

Poor water, sanitation, and hygiene practices contribute to the spread of infections and negative health outcomes in healthcare facilities and communities. Healthcare acquired infections (HAIs) negatively affect hundreds of millions of individuals worldwide, namely mothers and infants. Patients in low-resource countries face an increased risk of exposure to HAIs: 3–20 times higher than patients in similar settings in high-income countries.<sup>i</sup> Bacteria account for roughly 90% of all nosocomial infections, with protozoa, fungi, viruses, and mycobacteria accounting for the remaining 10%.<sup>ii</sup> Factors contributing to this risk include unhygienic environments and lack of adequate handwashing infrastructure, and lead to disastrous outcomes: 10–16% of global maternal and newborn deaths are attributed to sepsis.<sup>iii,iv</sup> Nearly all of these deaths occurred in low-and middle-income countries.

Chlorine is a widely used, effective chemical disinfectant recommended for infection prevention and control in health care settings. However, despite its proven effectiveness, the lack of consistent chlorine availability limits the ability of healthcare facility staff to provide a safe and hygienic environment for patients. A global survey of healthcare facility conditions in 78 low-and middle-income countries revealed 36.4% lacked chlorine solution for disinfection.<sup>v</sup> A PATH chlorine inventory analysis across 18 HCFs in Ghana and Uganda found that healthcare facilities face an average of 1.6 to 2.5 stock outs of chlorine per year, totaling roughly 55 to 74 days per year in which HCFs did not have chlorine. Weak supply chains, burdensome procurement processes, and insufficient budgets contribute to an unsteady supply of chlorine in HCFs, a challenge further exacerbated during times of crisis.

Electrolytic chlorine generators offer an attractive solution to addressing the key root causes of limited chlorine supply and stock outs in healthcare facilities. The ability to produce chlorine using simple inputs—water, salt, and electricity—at the push of a button make these devices well suited for low resource settings. When integrated into IPC and water treatment services, chlorine generators have the potential to significantly improve the quality of and trust in those services. Governments and organizations are increasingly turning to electrolytic chlorine generators for decentralized chlorine production. We see an opportunity to bring together interested stakeholders to create an open communication platform for sharing evidence, experiences, and approaches on how to stimulate the adoption of chlorine generators.

## Purpose

The decentralized chlorine production Global Community of Practice (CoP) aims to be an international consortium of civil society organizations, private-sector companies, and individuals committed to advancing innovative chlorine generation technologies and service delivery models for disinfection and water treatment. The CoP will function as a global advocacy, networking, and learning alliance, aiming to stimulate collaborative and transparent discussion among partners on lessons learned, evidence gaps, and candid feedback on challenges faced through the deployment and use of on-site chlorine generators.

Collectively, CoP members will seek to contribute to two overarching health goals:

- Reduce the burden of water-borne diseases in low- and middle-income countries by supporting the introduction and use of on-site chlorine generators for water treatment in household and community-based water systems.
- Reduce the burden of hospital-acquired infections in low- and middle-income countries through the introduction and use of on-site chlorine generators for improved infection prevention and control practices in healthcare facilities.

At the end of 2021, we will revisit the core objectives and programmatic breadth of this CoP and revise as appropriate.

## CoP benefits

We anticipate members, their beneficiaries, and the larger electrolytic chlorine generator community to benefit in three distinct ways:

- **Improved awareness and technical knowledge** across all CoP members of electrolytic chlorine generator technologies and their potential to address service delivery gaps. By sharing implementation approaches, measurement indicators, user feedback, contextual challenges, and results to date, government and civil society members will be better informed when conducting ongoing or future pilots and introduction projects. Chlorine generator manufacturers will similarly benefit by further understanding user needs, regulatory requirements, and how to more effectively deliver their products to consumers.
- **Strengthened collaboration** across organizations working to advance the adoption, integration, and use of on-site chlorine generators. There are numerous organizations currently advancing electrolytic chlorine generators, many facing the same challenges and gaps. Through transparent dialogue and virtual meetings, the CoP will enable its members to address these challenges collectively, deepening trust and confidence among its members.
- **Concerted advocacy and messaging** for stimulating innovation, policies, and accelerating market access of electrolytic chlorine generators. Championing the integration and adoption of electrolytic chlorine generators into health systems and markets will help strengthen the potential for sustained and continued future use of these products.

## Participation and structure

Participation in the CoP is voluntary and open to civil society organizations, private-sector companies, and individuals who are involved, or interested, in the generation and use of chlorine products for disinfection and water treatment. We seek to create a diverse, inclusive, and equitable platform that fosters open and honest communication and encourages a broad range of views and backgrounds. The CoP will initially be structured as a single convening body of members with up to four annual virtual meetings. Specific working groups may be created that allow interested participants to further research and discuss specific topics as they arise. Collaboration will be key to the success of the CoP, and we anticipate a diverse set of perspectives to be represented, including those from public, private, and civil society sectors.

PATH will act as the founding secretariat and convener for the CoP, with this role rotating annually (TBD) among interested members, as appropriate. The secretariat will be responsible for organizing meetings and setting agendas, incorporating new members and maintaining the member list, serving as a central liaison for technical requests, and managing the overall direction of the CoP through consultation with partners.

Interested members will be invited to participate in quarterly CoP virtual meetings to share evidence, technical expertise, and experiences regarding barriers, lessons learned, and successes related to on-site chlorine

generators. One or more presentations on a technical topic or project may be included in each virtual meeting, and these may come from private-sector manufacturers or service providers, government representatives, or implementing organizations. The virtual meetings and calls will also serve as a venue for members to network with other members and to explore opportunities for collaboration and funding opportunities.

Any interested organization/corporation/individual may contact PATH (Adam Drolet, [adrolet@path.org](mailto:adrolet@path.org)) and provide a name, primary contact, and other contact information to be added to the CoP member list. A brief summary of current and/or planned activities related to on-site chlorine generators and specific interest in participating on the CoP should also be included.

## CoP virtual meetings

Virtual meetings will be held quarterly and hosted initially by PATH. Roughly three weeks prior to the meeting, PATH will reach out to members asking for suggested agenda items. A final agenda will be sent roughly a week prior to the meeting. A tentative schedule is shown in the table below.

Quarter	Date & time*
Q1 2021	Thursday, April 29 <sup>th</sup> at 6 a.m. PST / 5 p.m. EAT / 7:30 p.m. IST
Q2 2021	Thursday, July 16 <sup>th</sup> at 6 a.m. PST / 5 p.m. EAT / 7:30 p.m. IST
Q3 2021	Thursday, October 14 <sup>th</sup> at 6 a.m. PST / 5 p.m. EAT / 7:30 p.m. IST
Q4 2021	Thursday, January 15 <sup>th</sup> at 6 a.m. PST / 5 p.m. EAT / 7:30 p.m. IST

\*To be confirmed. Note: EAT, East Africa Time; IST, India Standard Time; PST, Pacific Standard Time.

Several topics related to the adoption and use of on-site chlorine generators will be explored and discussed by the CoP. Areas of interest may include:

- **Technologies:** Product/technology agnostic, with manufacturers of products commercially available or in development invited to present on their technologies (specifications, benefits, evidence generated, etc.); contribute to discussions on challenges, barriers, and results to date; and collaboratively explore strategies to continue refining and improving product design and market introduction.
- **Regulatory, supply chain, and other supply-side issues:** In-country registration and regulatory authorization processes, manufacturing strategies, procurement processes, and supply chain, as well as post-sale support.
- **System integration, management models, and other demand-side issues:** Inclusive planning and policy integration, management models, demand/awareness generation, financing mechanisms and options, training strategies, service/infrastructure integration, monitoring and evaluation, operation and maintenance plans, and results dissemination approaches.
- **Evaluations on technical performance, usability, and operations:** Locations, use cases, implementation strategies, problem definition (including root causes of service gaps), beneficiaries and equity strategies, user acceptability, evaluation design and indicators, evidence to date and unanswered research gaps, and next steps.
- **Advocacy:** Advocacy to support for funding for electrolytic chlorine generator procurement and chlorine production, as well as monitoring and accountability for these activities via national and local health systems.

<sup>i</sup> World Health Organization (WHO). Health care-associated infections [fact sheet]. Geneva: WHO; 2016. Available at [http://www.who.int/gpsc/country\\_work/gpsc\\_ccisc\\_fact\\_sheet\\_en.pdf](http://www.who.int/gpsc/country_work/gpsc_ccisc_fact_sheet_en.pdf).

<sup>ii</sup> Khan HA, Ahmad A, Mehboob R. Nosocomial infections and their control strategies. *Asian Pac J Trop Biomed*. 2015;5(7):509-514. doi:10.1016/j.apjtb.2015.05.001.

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<sup>iii</sup> WHO. Maternal mortality [fact sheet]. Geneva: WHO; 2016. Available at <http://www.who.int/mediacentre/factsheets/fs348/en/>.

<sup>iv</sup> Oza S, Lawn J, Hogan D, et al. Neonatal cause-of-death estimates for the early and late neonatal periods for 194 countries: 2000–2013. *Bulletin of the World Health Organization*. 2015;93:19-28. Available at <http://www.who.int/bulletin/volumes/93/1/14-139790/en/>.

<sup>v</sup> Cronk R, Bartram J. Environmental conditions in health care facilities in low- and middle-income countries: Coverage and inequalities. *International Journal of Hygiene and Environmental Health*. 2018. <https://doi.org/10.1016/j.ijheh.2018.01.004>.