

Keeping Swimming Pools Open with Good Pool Chemistry

By Robert G. Vincent

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Swimmers in the jurisdiction of Illinois' Tazewell County Health Department (TCHD) may have enjoyed a summer of unprecedented access to their public pools. The credit for this happy state of affairs may be traced to a strong focus on proper pool chemistry and the consistent use of the old-school, but utilitarian, *clipboard* for help in monitoring and optimizing pool chemical levels.

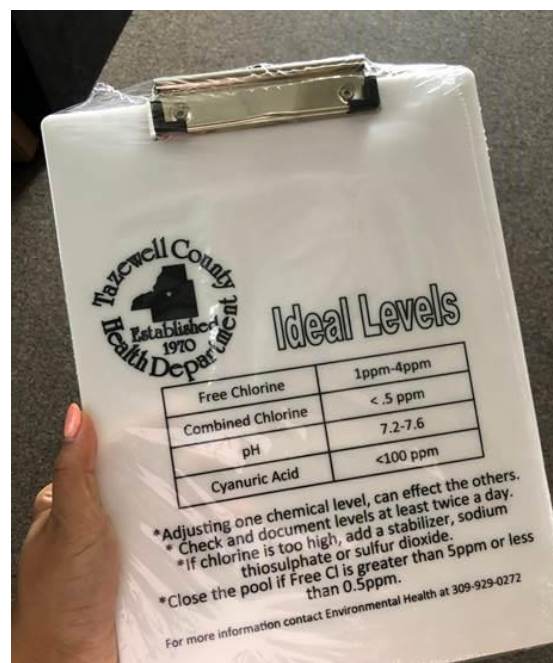
An [article](#) in the *Chillicothe Times-Bulletin* (August 3) describes a partnership between the health department and local public pool managers aimed at helping pool staff “provide safe recreational water for Tazewell County citizens,” according to an official correspondence from TCHD.¹ The health department “Quality Improvement Project” is getting excellent early reviews.

Back to the Basics

TCHD inspector Marie Heppe and her colleagues developed the pool staff clipboard (see image at right), which lists ideal levels of free chlorine,² combined chlorine,³ cyanuric acid,⁴ and pH,⁵ along with handy tips for maintaining these levels within appropriate ranges. The clipboards were introduced last year, and according to the *Chillicothe Times-Bulletin* article, “will help pool employees stay on top of their water quality checks and understand their importance.” At least one pool, the Tremont Community Pool, experienced *only one closure* so far this summer, notes the article, and that was not due to a water quality issue, but to a mechanical problem with the pumps.

A Goldilocks Problem with Free Chlorine Levels

The idea for the clipboard program emerged when TCHD officials examined data on indoor and outdoor pool closures in the county from 2013 to 2017. Of the approximately 165 pool closures in that period, the most common reason for closing pools was that *free chlorine levels were too high*; the second was that *free chlorine levels were too low*!⁶ Responding to this “Goldilocks



Tazewell County Health Department officials Marie Heppe, Bruce Johnson, Sarah Malik, Dylan Stasz, and Ashley Purdy created this durable, waterproof clipboard for pool managers to use in maintaining appropriate pool chemical levels in county pools.

Photo courtesy of Marie Heppe

¹ Goetze, M.,BS, LEHP, Tazewell County Health Department, letter to Tazewell County pool managers (January 2019).

² Free chlorine is produced in pool water when chlorine disinfectant is added, and consists of hypochlorous acid and hypochlorite ion; free chlorine destroys most waterborne pathogens within seconds.

³ When free chlorine reacts with nitrogen-containing or organic substances, the product is known as combined chlorine.

⁴ Cyanuric acid is a stabilizer for chlorine used in outdoor pools.

⁵ pH, which ranges from 0 to 14, is an indicator of the relative acidity of water; the lower the pH, the greater its acidity.

⁶ Goetz, M. (2019)

problem,” the new program strives to help pool staff get chlorine and other chemical levels “just right,” and recommends pool staff check and, when needed, adjust chemical levels at least twice daily. In addition to local public pools, all licensed pools in Tazewell County have been provided clipboards, including those in hotels and motels, schools, gym facilities, and apartments.

A Win-Win Project

TCHD’s Marie Heppel, who along with four of her colleagues developed the clipboard program, is pleased that the relationship between pool facilities and the health department has become stronger as a result of the partnership, and that pool managers are receptive to using the clipboards. In an email exchange, she told us that pool closures will continue to be tracked, tallied, and analyzed. “If the data from after implementing the project shows there was no decrease in pool closures, we will revisit the project and see how we can improve or adjust our strategy. I believe this project is the first step in the right direction but there may very well be more steps!”

We congratulate Ms. Heppel and her TCHD colleagues on their logical, back-to-basics approach to reducing pool closures in their jurisdiction, and look forward to their data analysis over time. Their work in this area may pave the way for real progress in keeping swimming healthy and safe nationwide.

Water Quality	pH
Poor Chlorine Disinfection Eye Irritation Skin Irritation	> 8.0
Most Ideal for Eye Comfort and Disinfection	7.8
	7.6
	7.2
Eye Irritation Skin Irritation Pipe Corrosion	< 7.0

Image [courtesy of CDC](#).

Pool Water pH and Free Chlorine Level: “Chemically Joined at the Hip”

CDC [calls chlorine and pH](#) “your disinfection team” for “protection against recreational water illnesses.” In fact, these two chemical parameters are intimately linked: Adjusting one affects the other. For example, at pH greater than 8, the germ-killing power of chlorine is low, increasing the odds that waterborne pathogens will not be destroyed. Additionally, the water is too basic (opposite of acidic) for bather comfort.

Lowering the pH helps raise the free chlorine concentration, which helps destroy waterborne pathogens, but lowering the pH of pool water below 7.2 makes the water too acidic for bather comfort. It can also lead to skin and eye irritation and pipe corrosion.

The ideal pH range for both bather comfort and disinfection is between 7.2 and 7.8. As CDC notes, “The best way to kill germs is by routinely measuring and adjusting both chlorine and pH levels.”

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