Cyber Hygiene: An Overview

Cybersecurity professionals are increasingly focused on human behavior as much as technology because cybercriminals know that it is easier to exploit human fallibility than technical vulnerabilities. The term "cyber hygiene" has arisen in the information security industry, but it has had different meanings and usage, and no formally recognized definition until recently. The prevailing usage relates the term to the interactions and behavior of individuals on the public internet.

People understand the concept of personal hygiene and the results of poor hygiene are obvious. Comparing personal cleanliness to individuals' cybersecurity habits is a useful and effective analogy, but it is noteworthy that the feedback loop provided by personal hygiene (for example, people who don't bathe will exhibit body odor, making them unpleasant to be near) does not exist in cyberspace. People often don't know what good cyber hygiene looks like, but they intuitively understand and recognize good personal hygiene (or lack thereof) with ease (understanding that cultural differences exist between populations).

The World Health Organization refers to hygiene as the practices of personal cleanliness that prevent the spread of disease. Unfortunately, the ways in which disease transmission occur, and the ways to prevent infection through personal cleanliness are much more broadly understood by the public than cyberattack threat vectors or how their cyber hygiene impacts their exposure to infection. Most people know that failing to wash your hands can spread diseases like hepatitis, but they are less likely to understand how poor cyber hygiene exposes them to potential infection by a banking trojan, for example. They may lack awareness of the existence of banking trojans as a threat at all.

The European Union Agency for Network and Information Security (ENISA) stated that *"cyber hygiene should be viewed in the same manner as personal hygiene and, once properly integrated into an organization will be simple daily routines, good behaviors and occasional checkups to make sure the organization's online health is in optimum condition";* however, it is not clear to many people exactly what constitutes "good" versus "bad" cyber hygiene.

 A recently published research paper entitled *Cyber Hygiene: The Concept, Its Measure and Initial Tests* by Decision Support Systems (A. Vishwanath, et al) delves deeply into the concepts described earlier in this white paper, and attempts to correct the lack of clarity for the term "cyber hygiene". The authors define cyber hygiene essentially as the practices that online consumers should follow in order to protect their personal information and devices from cyberattack. A. Vishwanath, et al approach the issue from a user awareness (as opposed to degree of compliance) perspective, leveraging the long history and experience in healthcare that the best way to increase disease prevention behaviors in a population is usually by raising awareness.

The authors' research identifies 18 parameters across 5 dimensions that can be measured quantitatively to yield a Cyber Hygiene Inventory (CHI) score. Their analysis concludes that this score predicts human behavior in cyberspace with a significant degree of statistical confidence. Predictable behavior includes an individual's perceptions about their use of technology, the way they process information online and their online banking behavior.

The five dimensions of the CHI (as defined by Decision Support Systems) are as follows:

1. Storage and device hygiene
2. Transmission hygiene
3. Social media hygiene (e.g. Facebook)
4. Authentication and credential hygiene
5. Email and messaging hygiene

Storage and device hygiene practices are activities relating to the configurations and settings on devices such as smart phones and PCs. Examples of good hygiene include limiting Bluetooth connections on your phone and ensuring your PC has a functioning firewall and antivirus software.

Transmission hygiene refers to practices related to internet connections. An example of good hygiene is using a VPN while on a public wi-fi network. Another is checking to see if a website uses SSL secure connections prior to making purchases by checking to see if the lock symbol shows on their internet browser.

Social media hygiene describes policies and tasks regarding how social media is configured and used. An example of a policy is to only accept "friend" requests from people who you know personally. Setting your privacy settings on Facebook is an example of good social media hygiene from a configuration perspective.

Authentication and credential hygiene are what most people equate to cyber hygiene. Good practices include using strong passwords and multi-factor authentication. Changing any default passwords (such as your wi-fi router's default password from the manufacturer) is another example of good hygiene.

Email and messaging hygiene is the last of the five CHI dimensions. It includes practices such as using cursor rollover on hyperlinks within emails to verify their addresses prior to clicking on them, and examining headers and content critically to evaluate their validity.

Table one of the report by A. Vishwanath, et al lists 39 cyber hygiene practices, winnowed down to the final 18 determined to be statistically relevant, broken out into the five categories described above.

Parents should teach their children good cyber hygiene in the same manner as they ensure their kids understand and follow good personal hygiene. Habits adopted early in life will often carry on to adulthood. Good hygiene (be it physical or cyber cleanliness) helps prevent infections or infestations, and also makes social interaction more pleasant.

REFERENCES

This paper summarizes the work of A. Vishwanath, et al (Decision Support Systems) in their research paper entitled *Cyber Hygiene: The Concept, Its Measure and Initial Tests*

References cited in their paper and referenced in this white paper are as follows:

European Union's #SaferInternet4EU campaign:

https://ec.europa.eu/digital-single-market/en/news/saferinternet4eu-campaign

Hygiene as defined by The World Health Organization:

https://en.wikipedia.org/wiki/Hygiene