PUBMED PART 1: HAPPY BIRTHDAY

Happy Birthday, PubMed. You're 10 now, and your companion MEDLINE is 45.

Honestly, it looks good on both of you.

How good? Well, over the past few decades, the National Library of Medicine (NLM) has received perhaps the highest compliment we, the people with an interest in medicine, can bestow: PubMed has become so integrated into our personal and professional lives as to become ubiquitous.

To honor that, let's spend the next few columns looking at how this evolved. We'll begin with a bit of history, and next issue, we'll look at searching and optimizing PubMed.

When print was not only king of information but also the only game in town,

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Index Medicus (IM) was the go-to source for biomedical literature citations. To be fair, others, including Chemical Abstracts, also indexed some medical literature, but IM began earlier and covered biomedical literature comprehensively.

IM began in 1879 and continued to publish in print long after electronic resources arrived on the scene. If you wanted to search, you went to a library that subscribed to IM, which, because it was in print, always had a delay between journal publication, indexing of the articles for IM and printing and delivery of IM to the limited number of libraries that subscribed.

How did we get from the print index used by researchers and scientists to PubMed? It took developments following a couple themes to converge. We

needed to develop a way to translate the print index to a searchable computerized version, distribute access geographically, remove fees and create a search interface both powerful and intuitive enough that scientists themselves could perform the searches.

In the early 1960s, NLM had the vision to explore computerizing IM and created MEDLARS, the Medical Literature Analysis and Retrieval System, which was launched in 1964 on a single mainframe computer.

In that era, mainframes were room-sized and processed jobs in batches, not on demand. Searches were sent to NLM, and it could take weeks to receive results. By the late 1960s, search requests were exceeding capacity.

Relatively contemporaneously, NLM began developing the idea of geographically dispersed searching by producing MEDLARS on magnetic tape and distributing these to a limited number of libraries that had mainframe computer access and training to process searches locally.

Overlapping this was an experiment that drove the evolution to interactive instantaneous searching. Using telex and then telephones to dial-in and time-share on mainframe computers, the lag time on searches dropped from weeks to minutes and ushered in the development of MEDLINE (MEDLARS Online).

In 1971, MEDLINE was released, and

in 1975, it replaced MEDLARS. Initially, MEDLINE boasted a capacity of up to 22 simultaneous searches and indexed 236 journals. In 2015, PubMed had 601 million unique visitors, ran 2.8 billion searches and indexed 5,618 journals. How did it make that leap?

From 1984 to 1996, search systems and interfaces evolved rapidly. These included Grateful Med, which allowed searchers who downloaded the program onto their personal computers and obtained a login to search MEDLINE without the search being mediated through a trained professional. In 1996, Internet Grateful Med moved the search to the internet.

NLM also released Experimental PubMed in 1996. It was so successful that, in 1997, the experimental label was removed and so were restrictions. For the first time, anyone with a computer and an internet connection, anywhere in the world, citizen or scientist, could search the MEDLINE database for free.

To learn more, visit NLM's History of Medicine blog, Circulating Now, http://circulatingnow.nlm.nih.gov, and look at the columns from February to April 2016.

To see a comparison of 1971 MEDLINE, 2006 and 2015 PubMed, visit the NLM Technical Bulletin, http://nlm.nih.gov/pubs/techbull, and look for the September-October 2016 issue.

To try what may be the next leap forward or at least watch the video, look at Semantic Medline, http://skr3.nlm.nih.gov/SemMed. **TV**

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