You Asked for it! CE

PATIENT SAFETY: Prescription for Precision: Improving Pharmacy Typing Accuracy

AN ONGOING CE PROGRAM
of the University of Connecticut School of Pharmacy and Pharmaceutical Sciences

EDUCATIONAL OBJECTIVES

After completing the continuing education activity, pharmacists and pharmacy technicians will be able to

- Explain the relationship between typing accuracy, workflow efficiency, and medication safety in pharmacy practice
- Demonstrate techniques that improve the accurate entry of prescription information, including drug names, SIG codes, patient demographics, and numeric data
- Identify cognitive, environmental, and ergonomic factors that contribute to pharmacy data-entry errors
- Apply deliberate practice and error-prevention strategies to enhance typing performance and reduce transcription-related medication errors

The Uconn School of Pharmacy and Pharmaceutical Sciences is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

Pharmacists and pharmacy technicians are eligible to participate in this application-based activity and will receive 0.2 CEU (2 contact hours) for completing the activity, passing the post-test with a grade of 70% or better, and completing an online evaluation. Statements of credit are available via the CPE Monitor online system and your participation will be recorded with CPE Monitor within 72 hours of submission

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To obtain CPE credit, visit the UConn Online CE Center https://pharmacyce.uconn.edu/login.php. Use your NABP E-profile ID and the **session code 26YC40-KTF31 for pharmacists and 26YC40-FKT13 for pharmacy technicians** to access the online quiz and evaluation. First-time users must pre-register in the Online CE Center. Test results will be displayed immediately and your participation will be recorded with CPE Monitor within 72 hours of completing the requirements.

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TO REGISTER and PAY FOR THIS CE, go to: https://pharmacyce.uconn.edu/program_register.php

TARGET AUDIENCE:

ABSTRACT: Accurate data entry is a critical pharmacy technician skill that directly affects workflow efficiency, prescription processing, and patient safety. Typing and transcription errors involving medication names, numeric values, patient information, and prescription directions can contribute to dispensing delays, workflow inefficiencies, and medication errors. This continuing education activity. reviews practical strategies pharmacy technicians can use to improve typing proficiency and data-entry accuracy in pharmacy practice. Topics include prioritizing accuracy over speed, developing touch-typing skills, improving numeric keypad proficiency, mastering common drug names and SIG codes, and using deliberate practice techniques to strengthen performance. Additional discussion focuses on cognitive control, task switching, simulation-based training, deliberate error review, ergonomic principles, and methods for improving pharmacy-specific reading speed. The activity also examines how interruptions, distractions, and environmental factors can affect typing performance and provides evidence-based recommendations for reducing error risk. By combining structured practice, targeted feedback, pharmacy-specific skill development, and ergonomic optimization, pharmacy technicians can enhance both efficiency and accuracy during prescription processing. Strengthening these competencies supports safer medication use, reduces the need for rework and error correction, and contributes to improved patient care in community and health-system pharmacy settings.

FACULTY: ..... at the University of Connecticut.

FACULTY DISCLOSURE: The authors have no financial relationships with an ineligible company.

DISCLOSURE OF DISCUSSIONS of OFF-LABEL and INVESTIGATIONAL DRUG USE: This activity may contain discussion of off label/unapproved use of drugs. The content and views presented in this educational program are those of the faculty and do not necessarily represent those of the UConn School of Pharmacy and Pharmaceutical Sciences. Please refer to the official prescribing information for each product for discussion of approved indications, contraindications, and warnings.

INTRODUCTION

Jake works as a pharmacy technician. He prides himself on being the fastest typist on his team and is confident that he will catch his mistakes upon proofreading. He doesn't understand why the pharmacist always tells Laurie to take over for him when it gets busy.

Brenda is a new pharmacy technician who incorrectly transcribed a prescription as prednisolone. The prescription is for a patient who has severe liver disease, and the doctor prescribed prednisolone to treat an infection. Patients with liver disease usually cannot metabolize prednisone, and the medication would not be effective.[1] Luckily, Brenda's coworker caught the error before the patient received the drug. Retyping labels and correcting the insurance submission delayed delivery of the prescription to the patient. Many drugs have similar names, which are easy to confuse, and pharmacy technicians must stay focused on accuracy.

Both Jake and Brenda can improve their job performance by honing their skills to type, transcribe, and enter information accurately. Pharmacy technicians should focus on drug name accuracy, and correct doses, units, and quantities. They should also focus on providing high quality patient instructions and entering the correct patient data including medical history and drug allergies, health conditions, and other medications that the patient takes.[2,3]

PAUSE AND PONDER: When it's your turn to occupy the data entry hotseat, how do you feel? What is your "net words per minute"?

PRIORITIZE ACCURACY OVER SPEED

Focusing only on speed as a measure of success is flawed thinking. Gross words per minute (WPM) is not a true indication of mastery. Experts use net WPM to account for typing errors to give an overall picture of speed plus accuracy.[4] In the example above, Jake's gross WPM is 55 but he makes 10 mistakes per minute. This results in a net of 45 correct WPM. Laurie types at only 50 WPM (gross) but makes only one error every two minutes. Her net WPM of correct words is 49.5. Even though Jake is a good proofreader and catches most of his errors, it takes time to locate the errors and retype them, further increasing the time to complete the job. Laurie's efficiency is greater than Jake's and justifies the pharmacist's decision to call on Laurie when the pharmacy is busy.

@Flaticon/Smashicons

Fast, error prone typing takes longer than slower-paced error-free typing. Every error requires extra time to complete the task. Technicians must locate each error, delete the wrong letters, and then retype. Pharmacy personnel may then need to repeat multiple tasks: printing labels, writing SIGs, dispensing medications, and resubmitting claims to insurance companies. If personnel do not discover errors until further down the line, the consequences may be more damaging, including patient harm and required reporting to regulatory authorities.

Here are some suggestions for improving typing accuracy[5,6]:

- Practice, practice, practice.
- Mix it up. Open any book and type a page, then proofread. Move on to a pharmacy-related textbook.
- Track your progress.
- Use online tools:
  - Typing.com, which is a general typing improvement website but has advanced lessons including common medical terms
  - The Practice Test (https://thepracticetest.com/typing/), which contains pharmacy-specific typing and data entry lessons, drills, and tests. It also prompts you to slow down if you type like Jake does!
  - You can find additional online typing tools in the Learn True Touch Typing section below.

Once technicians consistently achieve high accuracy (greater than 95% accurate), they can work to gradually increase WPM. They can periodically retest and participate in additional practice exercises, when needed, to help maintain a high level of competency.

Learn True Touch Typing

Imagine: It's January 2nd. Phones are ringing off the hook because the pharmacy was closed the day before. The pickup line is already five patients deep and each patient's deductible has reset for the year. There's a knock at the door. The wholesaler delivery is already here, and the pharmacist needs to verify the narcotics in the shipment. Oh, and the regional manager only authorized enough hours for one pharmacist and one technician for the full day. Wouldn't it be nice if there were eight more people behind the counter with you to help?

Now, imagine another situation: 10 employees are scheduled, but only six are doing their job efficiently. The other four just stand in each corner and put away a bottle of medication every few minutes. This analogy can also apply to your typing. Whether you peck the buttons like a chicken with just two fingers or only use six of your 10 fingers to type, you're not operating at maximum efficiency. True touch typing, also referred to as just "touch typing," involves using all 10 fingers to type, thus increasing efficiency and speed.[7] Think about how much time you

SIDEBAR: Practice Makes Permanent: QWERTY Can Teach Us About Typing Accuracy[8,9]

Christopher Latham Sholes, who helped create one of the first commercially successful typewriters, developed the QWERTY layout in the 1870s. It's named for the first six letters in the upper-left row of the keyboard. A common myth is that Sholes designed QWERTY to make people type slowly. The reality is more nuanced. Early typewriters used mechanical arms (called typebars) that could jam if the typist struck neighboring keys in rapid succession. Sholes rearranged letters to reduce the likelihood of mechanical interference among commonly used letter combinations. The goal was to improve the machine's reliability.

When the Remington company marketed Sholes's typewriter, users widely adopted the QWERTY arrangement. By the time alternative layouts were introduced in the 1930s, millions of people had already learned QWERTY. The cost and inconvenience of retraining typists outweighed any potential advantages of switching.

Today, QWERTY remains the dominant keyboard layout worldwide, despite repeated claims that other layouts may be faster or more ergonomic. Research generally shows that while alternative layouts may have benefits, experienced QWERTY typists can achieve very high speeds and accuracy because of years of practice and muscle memory.

The QWERTY keyboard's enduring success illustrates an important principle of learning: repeated actions become automatic. Just as experienced typists no longer think consciously about the location of individual keys, pharmacy technicians can develop automatic accuracy through deliberate, correct practice. As typing instructors often say, "Practice makes permanent."

spend tilting your head down to the keyboard to look for the letter you need to type, back up to the computer monitor to make sure the correct letter was selected, back down to the keyboard for the next letter, and so on.

Alternatively, even if you're using more than two fingers to type, how often do you make mistakes that take time for correction? Learning true touch typing will be a boon for all levels of typists. No special equipment is needed: just your standard work-issued QWERTY keyboard (see the **SIDEBAR**) and all ten of your fingers. An ergonomic keyboard may offer some comfort. If you currently suffer from carpal tunnel or general wrist/hand strain, the act of keeping your wrists in a neutral position and using each finger equally with true typing may provide even better relief.[7] Resources on learning or even improving your typing technique are available online at no charge. Everyone has a different learning level and current level of accuracy. Consider visiting any of the following websites to start:

- https://www.keybr.com/, which has you type similar words and calculates your typing speed as you go.
- https://www.typingclub.com/, a site that teaches touch typing
- https://www.typinggym.com/, which uses random words to help increase speed and accuracy
- https://www.ratatype.com/, a site that provides a certificate when you reach excellence
- https://monkeytype.com/, a free online typing tutor designed for experienced typists to practice and measure typing speed and accuracy.

Once you find a website or two that meshes well with your learning style, the next step is to simply practice! Touch typing involves building muscle memory. Did you learn how to ride a bike proficiently in one day? If you did, you may also already be a good typist. For most of us, removing the training wheels and learning to balance on a bike took multiple evenings and weekends of practice. Noticeable improvement in typing proficiency can develop in as few as two weeks of practice.[10]

Once you learned how to balance on the bike, did you start speeding down big hills or did you stick to the flat neighborhood streets? True typing values accuracy over speed. Trying to type 90 words per minute without proper finger placement is like attempting to bike down big, steep hills as you keep falling off your bike. You may land at your destination at the same time as your friend who took it slow on the flat neighborhood rows and didn't fall. Then again, you may not.

Finger placement is key for accuracy, and it all starts with the home row. Unless you're working on a very old and well-used keyboard, you might have noticed the F and J buttons have raised notches on the bottom of the buttons. These are called "tactile home position indicators" and they serve as physical guides to keep your hands oriented correctly.[11] When you're getting ready to type, start with your left index finger on the F button and your right index finger on the J. From there, you might find your fingers naturally rest on the surrounding letters with your thumbs oriented towards the spacebar. Left middle finger goes to D, left ring finger to S, and left pinky to A.[12] Mirror the placement for your right hand. Now the whole row of letters, save for G and H, have a finger resting on them. This finger placement is ideal for stretching your reach as little as possible to access each possible letter. Save your pinkies for the Caps Lock, Shift, and Enter buttons. With proper hand placement, you are now prepared to run some typing drills! Remember, practice makes perfect. Don't be discouraged if your starting word count per minute is 25. Keep at it and soon enough you can be three times as proficient. Next, let's discuss the specific typing needed in the pharmacy.

Table 1. Common Routes of Administration and Their SIGs[7,10]		
SIG	**Definition**	**Latin (if applicable)**
AAA	Apply to affected area	
AD*	Right ear	*auris dextra*
AS*	Left ear	*auris sinistra*
AU*	Each ear, both ears	*auris utraque*
BUCC	Buccal, inside the cheek	*bucca*
IM	Intramuscular, into the muscle	
INH	Inhalation, inhale	
INJ	Injection, to be injected	
IV	Intravenous, into the vein	
OD*	Right eye	*oculus dexter*
OS*	Left eye	*oculus sinister*
OU	Each eye, both eyes	*oculus uterque*
PO	By mouth	*per os*
PR	Per rectum, by rectum	
SC, SQ, SUB Q*	Subcutaneous, under the skin	
*For many years, the Institute of Safe Medication Practices (ISMP) has published a list of DO NOT USE SIGs because they are associated with errors. Regardless, clinicians continue to use them and they are in red text for that reason. Find the complete list here: https://www.ismp.org/sites/default/files/attachments/2017-11/Error%20Prone%20Abbreviations%202015.pdf		

Practice Pharmacy-Specific Typing

Let there be a signature! Or, "let it be labeled." This is what the Latin word *signetur* means.[7] Often shortened to just "SIG," this is the information that the pharmacy's typist transcribes from the original prescription to the prescription label for the directions for use. Pharmacy SIGs are a language of their own, often shortened to various acronyms. There is plenty to learn, but never fear: with enough practice, you'll catch onto the lingo. Before you buy a dictionary, let's first decode a SIG. Every valid SIG will contain three "hows": how to take the medication; how much to take of the medication; and how often to take the medication. A fourth how is included sometimes but isn't always necessary: how long to take the medication.

Let's focus on how to take the medication first. "Take" is often followed by "by mouth" after the quantity is listed. Medications can also be inhaled, injected, applied topically, inserted vaginally, or dropped into the eyes. The amount of medication to be taken follows the first verb of the SIG, which tells the patient how the medication is to be consumed. After the amount of medication is known, the action is completed with the route of administration. **Table 1** lists common routes of administration and their SIG codes. For routes of administration that don't translate directly in English, the abbreviation is often in Latin.

The next part of the SIG is how much of the medication to take. This is a numeric value accompanied by the type of medication being prescribed. When an ointment or lotion is to be applied topically, sometimes both the amount to be applied and the type of medication itself is omitted from the SIG. "Apply topically to affected area" followed by the frequency of application is often sufficient. **Table 2** on the following page lists some additional abbreviations that pharmacy personnel need to know.

The final part of the SIG is how often to take the medication (see **Table 3** on page 6). The abbreviation "Q" is popular, but never alone. It's always followed by further instruction. "QHS" would be every night. "Q4h" would be every four hours. How long to take the medication may be included if it's not a maintenance medication. "TAT" or "Until all gone" is common for antibiotics, as this encourages the patient to finish their prescription even if they're feeling better mid-course.

Sometimes the prescriber includes further instruction concerning the time of day the medication should be taken or other conditions that need to be met when the medication is taken. **Table 4** on page 7 describes these.

Beyond the label you'll come across some other common abbreviations in the pharmacy. "Dispense as written" is abbreviated as "DAW." This means that the medication needs to be dispensed exactly as prescribed without any substitution for brand or generic when applicable. In the Notes to Pharmacy section, a provider may write, "d/c amlodipine." This means amlodipine is to be discontinued. Sometimes the prescriber omits the forward slash.

The long 11 or 12-digit code on the medication bottles is the "National Drug Code" or "NDC."[7] This is a unique set of numbers assigned to each medication manufacturer, the medication itself, the strength, and formulation of the medication.

Table 2. Additional Abbreviations [7,10]		
SIG	**Definition**	**Latin (if applicable)**
AMP	Ampule	
CAP	Capsule	
CR	Cream	
GTT	Drop	*gutta*
LOT	Lotion	
MDI	Metered dose inhaler	
NEB	Nebulizer	
PKT	Packet	
SUSP	Suspension	
TAB	Tablet	
TROCH	Troche, lozenge	*trochiscus*
UNG	Ointment	*unguentum*

Transcribing SIGs is serious business. If the wrong information is entered from the get-go, the whole prescription could be misfilled.[11] Study these acronyms and SIG formulas often. Soon enough, you'll have mastered another language.

Build Numeric Keypad Skills

Numeric data entry is a significant source of medication errors.[13-15] It is easy to leave a number out, enter a wrong number, swap the number order, or add an extra number.[16] Any of these mistakes could have catastrophic consequences for the patient.

Using the numeric keypad instead of the main keyboard number row can help lower error rates, especially when under time constraints.[16] When you have the choice, use a numeric keypad with a calculator layout (1-2-3 on the bottom), which is faster and more accurate than a keypad with a telephone layout (1-2-3 on the top).[17] Building your skill and confidence with the numeric keypad will help you enter medication quantities, NDC numbers, day supplies, dates of birth (DOBs), and insurance IDs with accuracy and speed.

It's (mostly) all in the fingers! Single-finger typing is faster and more accurate than multi-finger typing for numeric data entry.[18] A **PRO TIP** is to use your dominant hand's index finger on the numeric keypad – it's the speediest and most accurate way to enter numbers![19,20] And here's a suggestion for left-handers. Numeric keypads are always located on the right, making typing with your left index finger very awkward. Some lefties learn to be ambidextrous. Others use a detachable keypad on the left side of the keyboard.

Practice typing quickly when you are not under time constraints to increase speed and accuracy over time.[21] Enter mock prescriptions, dates of birth, patient phone numbers, and day supply calculations as quickly as you can for practice. Repetition is key! Drill specific number sequences that you often use, like certain NDC numbers.[22] When you do this, your brain recognizes the number sequence, and your finger follows the movement pattern easily and quickly. With repetition, your brain and finger muscle memory may retain this number sequence for months!

"Memory loading" can help increase speed while maintaining accuracy on the numeric keypad, too. This is when you type the previous number from memory while viewing the next number in the sequence.[23] Let's see memory loading in practice! You need to type 48372619 into the system. Instead of looking back and forth at each individual number, you might briefly memorize 48-37 and type it while looking ahead to the next part – 26-19. This reduces interruptions in visual focus and allows for faster, smoother data entry.

"Chunking" (which sounds like a silly word but is the exact term that psychologists use for this practice) is another way to increase speed on the numeric keypad.[23] Separating long strings of numbers into two- or three-digit groups can facilitate faster data entry. For example, if you needed to enter the sequence 4958928495 into the system, you could break it into groups such as 49-58-92-84-95.
Here's another **PRO TIP:** Practice typing quickly, drill commonly used number sequences, use the memory loading technique, and chunk long strings into two- or three-digit groups!

Be aware that digits 3, 8, and 9 tend to be the highest-risk keys on the numeric keypad (probably because they tend to be used less frequently in prescriptions).[16,17] Knowing this can help you avoid mistakes when you encounter them! Additionally, be aware that "out by 10" errors – miskeying a zero or decimal point - are common and potentially very dangerous.[24] In fact, this is the most clinically dangerous numeric entry error there is. Stay vigilant.

Producing medication labels may be one of the most error-prone pharmacy tasks due to numeric keypad errors and rushing under time pressure.[25] Consider implementing the following strategies in your pharmacy to reduce the risk of errors[23,26-28]:

- Require a second verification for all numeric fields
- Discourage rushing during numeric data entry
- Use barcode scanning as the primary entry method if it's available
    - Use manual keypad entry only as a backup
- Include a confirmation step after numeric fields are entered
- Standardize field formatting
    - Present NDCs, insurance IDs, and other long numeric strings in chunks when possible to align with natural cognitive processing

LEARN COMMON DRUG NAMES IN CHUNKS

With thousands upon thousands of medications in the world, learning and accurately typing their names are daunting tasks for even the most fearless pharmacy technicians! Many drug names are similar, and drug classes often share suffixes (a final segment

Table 3. Common Frequencies and Their SIGs[7,10]

SIG	Definition	Latin (if applicable)
AM	Morning, in the morning	*ante meridiem*
BID	Twice daily, two times daily	*bis in die*
H or hr	Hour	*hora*
HS*	At bedtime	*hora somni*
PM	Evening, in the evening	*post meridiem*
PRN	As needed	*pro re nata*
Q	Each, every	*quaque*
QID	Four times daily	*quater in die*
QAD or QOD*	Every other day	*quaque alternis die*
TAT	Until all taken	
TID	Three times a day	*ter in die*

*For many years, the Institute of Safe Medication Practices (ISMP) has published a list of DO NOT USE SIGs because they are associated with errors. Regardless, clinciians continue to use them and they are in red text for that reason. Find the complete list here: https://www.ismp.org/sites/default/files/attachments/2017-11/Error%20Prone%20Abbreviations%202015.pdf

added at the end of a word to modify the word's meaning). Biologics come with their own naming conventions. In addition, medicines have both generic and brand names. The limitless number of names to learn can contribute to inaccuracies when typing and transcribing prescriptions. Mixing up drug names is a serious problem that may harm patients, require repeating parts of the pharmacy workflow (decreasing efficiency), and necessitate reporting to regulatory authorities.[3] Breaking the task down into manageable steps may be useful. This section offers potentially helpful approaches.

Understand the Classes of Medicines

Classes of drugs often share word components and often have a common suffix. Examples of drugs with common suffixes include: -pril (ACE inhibitors) such as lisinopril, enalapril; -olol (beta blockers) such as metoprolol, propranolol; -cillin (antibiotics) such as amoxicillin, penicillin; -statin (statins) such as atorvastatin, simvastatin. The Top 200 Drugs Study Guide contains an extensive list of examples.[29]

Many biologics follow naming conventions and can also share common suffixes. Examples include: -ase (enzymes), -cel (cell therapies), and -rsen (antisense oligonucleotides).[30]

Monoclonal antibody and gene therapy names are even more complex but convey a lot of valuable information. Historically, monoclonal antibody names consist of a prefix (a segment added at the beginning of the word to help with pronounceability), then components to identify the antibody target and the species from which the antibody was derived, followed by the suffix “mab” (monoclonal antibody).[30] In 2021 the World Health Organization International Nonproprietary Names Programme retired the universal -mab suffix for new monoclonal antibodies and replaced it with four new stems.[31] The change was made because the number of antibodies had become so large that the old system was running out of distinguishable names.[31] **Table 5** on page 8 lists the new names and their meanings.

Gene therapy names consist of two words. The first word corresponds to the gene (being replaced or corrected) and the second word corresponds to the vector (the backbone of the gene therapy product). Components also include prefixes for uniqueness, elements to denote the pharmacology class, and the type of viral vector.[32]

Breaking it Down – the Process

From the few examples given, one can appreciate the enormity of the task of mastering the spelling and error-free typing of even a fraction of the drugs and biologics that exist. Here are some suggestions for breaking the task down[29,30,33-35]:

- Work from the list of the Top 200 Drugs and study materials available to pharmacy technicians.
- Focus on one drug class at a time
- Set reasonable goals; for example, practice typing 10 names per day for 20 days
- Proofread carefully for correct spelling; remember that accuracy is key
- Focus on the whole name, instead of the order of the individual letters, to increase the chance of recognizing misspelled names
- Once accuracy is high, purposefully increase typing speed
- For more advanced practice, use lists of sound-alike drug names

Practice, Practice, Practice

After initial success in mastering the Top 200 drug list, and lists of sound-alike drug names, technicians can—and must—continue to practice to keep their typing and spelling skills sharp. Technicians can apply many of the same principles they used for increasing the accuracy of typing drug names to increasing the accuracy of other pharmacy tasks, such as typing common SIG codes and common insurance terms.

PAUSE AND PONDER: After practicing your typing, you finally believe you are comfortable at the computer in your pharmacy. You log in and begin your first new patient data entry. First name? C-H-R-I-S-T-O.... **the pharmacist calls your name** ... P-H-E.... **pharmacy call on line one** ...R **another patient appears at the counter yelling for help**. Too many things are happening at once! Who do you help first? Do you continue your entry? What can you do to prepare in advance for the future?

Simulate Real Pharmacy Conditions

Learning typing skills from the comfort of home is a great place to begin, but it may not prepare a pharmacy technician for the hustle-and-bustle of everyday pharmacy life. Pharmacy is a dynamic environment; technicians constantly answer phone calls,

triage patients, count prescriptions, and complete many other exhausting responsibilities.

To prepare for typing during busy pharmacy hours, technicians can use simulated pharmacy environments to learn cognitive control techniques (mental processes that allow individuals to plan, focus, remember, and juggle multiple tasks effectively). Cognitive control consists of two perspectives, called cognitive stability and cognitive flexibility, that can help anyone improve their adaptive behavior and handle overwhelming environments.[36] Technicians must understand each cognitive perspective and learn which predominates for them to create the optimal pharmacy simulation..

Generally, cognitive stability helps block unimportant background noise to prevent distraction, whereas cognitive flexibility helps switch between tasks swiftly and accurately. However, true cognitive control requires a balance between both. For example, pharmacy technician Annie's cognitive stability is strong but she may accidentally ignore a patient during data entry; conversely, Paul's cognitive flexibility dominates but he is consistently distracted by other triggers, potentially leading to medication errors.[36]

For overly stable technicians like Annie, task switching techniques can improve flexibility. Task switching refers to the ability of an individual to transition between tasks in changing environments.[37] Although most often seen in people with attention deficit disorder, task or decision paralysis can inhibit individuals from completing tasks if they become fixated on one task or find themselves overwhelmed with responsibilities.[38] People with these characteristics will benefit the most from simulations that refine task switching behaviors.

For technicians trying to improve task switching competency, a **PRO TIP** is timing how long it takes to enter a fake prescription correctly, then gradually decreasing the time intervals during practice. Over time, this practice can improve task pacing to prepare for moving swiftly in a busy pharmacy. After the timer ends, technicians should halt their task and switch focus entirely on a new task or typing exercise. Task switching proficiency also helps prevent multitasking while typing, which is associated with increased prescription errors and results in more time spent per task.[39]

After achieving success with beginner timer simulations, technicians can increase the task's difficulty. Technicians can shorten the timer, make it louder and more annoying, or work with fake patient situations. To further simulate the pharmacy experience, technicians can address the fake patient while finishing up typing tasks:

- "Hold on Mrs. Smith; I'll be at the register in one minute."
- "Mr. Brown, how are you today?"
- "Crazy weather we had recently, hopefully the rain isn't ruining your week!"

Table 4. Abbreviations for Consumption Conditions[10]

SIG	Definition	Latin (if applicable)
ac	Before meals	*ante cibum*
c	With	*cum*
Pc or pp	Postprandial, After meals	*post cibum*
s	Without	*sine*

In addition to improving cognitive stability, adding these quips to the simulation will help improve patient experiences if applied to the real world. Researchers believe that these non-medical discussions can improve patient perceptions of medical interaction. By adding them to the simulation, pharmacy technicians learn to cultivate an elevated pharmacy experience for patients, while improving typing task switching.[40]

On the other end of the spectrum, overly flexible technicians like Paul must learn to avoid distractions. Researchers reviewed 51 studies that indicated pharmacists and technicians experience up to 20 interruptions per hour.[41] With frequent interruptions, pharmacy technicians must maintain focus to prevent medication errors. It may be difficult to create a natural, noisy environment at home, so technicians can practice in busy locations such as coffee shops, diners, or other locations to simulate typing with distractions. (Just be sure to use information that's been de-identified or fake, if you're outside the pharmacy!) Technicians can integrate skills needed to master typing in a pharmacy setting, such as reading pharmacy specific documentation that includes drug names, SIG codes, and other medical terminology.

Outside of creating a mock pharmacy environment, some online computer software mimics prescriptions and patient interactions. Major companies including Redbull, Johnson & Johnson, and Walmart use popular online simulator called The Forage (find it here: https://careerhub.umt.edu/resources/forage/) for jobs across all fields.[42] For pharmacy technicians, The Forage created a simulator that delivers a free, fast-paced retail pharmacy re-creation that even provides a certificate after completion.[43] Other companies designed services such as MyDispense or Pharmacy Simulator for pharmacists, but offer customizable options to decrease complexity if needed.[44] Any of these software programs can teach technicians to type in pharmacy specific scenarios.

USE DELIBERATE ERROR REVIEW

For some people, certain typing errors occur repeatedly. These errors may involve medication names, SIG codes, quantities, days' supply calculations, or patient information. Rather than simply correcting mistakes as they occur, technicians can improve accuracy by using a deliberate error review process.

Deliberate error review involves identifying recurring mistakes, tracking them, and practicing the skills needed to prevent them. This approach is based on the principle that targeted practice is

often more effective than general repetition. By focusing on specific weaknesses, technicians can develop greater accuracy and confidence when entering prescription information.

A simple method is to maintain a personal list of common errors. The list might include frequently misspelled drug names, SIG instructions that are often entered incorrectly, confusing abbreviations, or days' supply calculations that have required correction in the past. For example, a technician who repeatedly misspells “hydroxyzine” or confuses it with “hydralazine” can devote extra attention to distinguishing these medications; she might remind herself to “look beyond the H-Y-D.” Similarly, a technician who frequently enters incorrect days' supply values can review calculation procedures and practice with sample prescriptions.

Periodic review of this error list helps reinforce correct habits. Some technicians find it useful to create flashcards, practice typing challenging medication names, or review examples during downtime.

Learning to type medication names accurately is similar to learning a difficult passage on the piano. Many beginning pianists make the mistake of practicing a piece at full speed and simply repeating it whenever they make an error. Unfortunately, repetition can strengthen the memory of the mistake and the memory of the incorrect notes. Piano teachers often recommend slowing down, playing the passage correctly several times in a row, and gradually increasing speed only after accuracy becomes automatic. Technicians can approach challenging medication names the same way. If a technician repeatedly misspells a medication name, slowly typing it correctly multiple times can help establish the correct spelling pattern. Speed should increase only after accuracy is consistent. This deliberate practice helps replace incorrect habits with correct spellings and reduces future typing errors. A good way to remember this is that practice does not necessarily make perfect — practice makes permanent.

Others may benefit from discussing recurring errors with a supervisor or experienced colleague who can suggest strategies for improvement. The goal of deliberate error review is not to dwell on mistakes but to learn from them. Consistently examining and addressing recurring errors can improve data-entry accuracy, reduce the need for corrections, and contribute to medication safety. Over time, technicians who actively monitor their own performance often become faster and more accurate because they have eliminated many of the errors that previously interrupted their workflow.

Improve Ergonomics

An ergonomically designed workspace (an environment designed to be comfortable, efficient, and safe for humans to use) maximizes typing efficiency, reduces fatigue, and helps to prevent long-term overuse injuries. Chairs, desks, keyboards, monitors, and more can be optimized to promote a neutral body position,

Table 5. New INN Monoclonal Antibody Nomenclature Scheme[31]

Stem	Meaning
-tug	Unmodified monospecific immunoglobulins
-bart	Engineered ("artificial") monospecific immunoglobulins
-mig	Bi- or multispecific immunoglobulins
-ment	Antibody fragments lacking an Fc region

where joints are held in their natural alignment. According to the Occupational Safety and Health Administration (OSHA), this looks like[45]

- Hands, wrists, and forearms aligned and nearly parallel to the floor
- Head and torso aligned and facing forward
- Shoulders relaxed, without needing to scrunch up or hunch forward
- Elbows bent at a 90-to-120-degree angle and kept close to the body
- Back vertical or slightly reclined, with the spine’s natural S-shape maintained
- Thighs, knees, and hips in alignment
- Feet flat on the floor or on a footrest

Adjust chairs (if you’re lucky enough to have one in your pharmacy) and keyboard trays so that elbows are at or slightly above keyboard height when arms hang naturally. Let’s go back to the piano example. Piano teachers help their youngest students sit in the proper position by having them sit on a book! Periodically check your shoulder position to avoid scrunching. Keep keyboards close enough to avoid reaching or leaning forward, but far enough away to position forearms parallel to the floor. Experiment with adjusting the keyboard feet or raising the front of the keyboard to avoid any upward, downward, or sideways bending of the wrists. Let your hands move freely above the keyboard when typing, so you won’t need to stretch or bend your wrists to reach keys. Wrist rests should only be used to support the palm or heel of the hand when resting between spurts of typing.[45]

Position computer monitors 20 to 40 inches away from your eyes, with the top of the monitor at or just below eye level.[45] The goal is to read comfortably with your neck in a neutral position. Monitors should ideally sit directly in front of you, but no more than 35 degrees to either the left or the right. A document holder beneath or to the side of the monitor minimizes head and neck movement when transcribing from a paper prescription. The American Optometric Association recommends taking a 20-second break to focus on something 20 feet away every 20 minutes when using a computer.[46] To further reduce eye fatigue, keep the workspace well lit (while taking care to avoid glare on screens).

Pharmacies can also increase efficiency by protecting workers from phones. A 2025 review of 51 studies found that distractions and interruptions[47]

- Happen to pharmacy personnel 5 to 20 times per hour
- Occupy nearly 25% of US pharmacy personnel's work time
- Account for 12% of reported medication errors in community pharmacies
- Are most commonly phone calls

Phone calls create both distractions (shifts in workers' attention as they decide whether to take the call) and interruptions (switching tasks if the call is answered).[48] Place phones away from medication preparation and dispensing areas, and consider using a call center or an answering machine to more safely integrate phone calls into the workflow. Mobile phone use is also a frequent cause of distractions,[47] so for the sake of patient safety, be sure yours does not interfere with your work.

Develop "Pharmacy Reading Speed"

Typing speed is often limited by reading speed, and reading speed is severely limited by unfamiliar words. A 2011 study suggests that people read familiar words whole, regardless of word length, while they decode unfamiliar words slowly syllable-by-syllable.[49] Since skilled typists often scan multiple words ahead while transcribing,[50] unfamiliar words can bottleneck this process. Drilling brand and generic pairs of frequently prescribed medications transforms unfamiliar words into well-known vocabulary, while enabling efficient selection of products to dispense. Flashcards are available from the Pharmacy Technician Certification Board (PCTB)[51] for individuals or employers to purchase, or from a variety of different study aid sites for free.

While an unfamiliar word presents a bottleneck in the prescription entry process, an illegible handwritten prescription can be a cork. Fortunately, with the rise of electronic prescribing (even back in 2021, 94% of all prescriptions in the United States were e-prescribed[52]), pharmacy staff encounter this issue less frequently. When they do, familiarity with top medications, including names, routes, and typical doses, can help provide clues for interpretation.[53] PCTB has practice tools that drill these key facts for commonly prescribed medications.[51]

Practicing reading handwritten prescriptions can also be helpful (and entertaining). Articles in *Pharmacy Times*,[54] pharmacy forums, and media accounts provide plenty of examples and techniques for practicing. Of course, pharmacy personnel should be familiar with the Institute for Safe Medication Practices List of Error-Prone Abbreviations (https://www.ismp.org/sites/default/files/attachments/2017-11/Error%20Prone%20Abbreviations%202015.pdf),[55] and never hesitate to have a prescriber clarify when needed. If a prescription reads like a guessing game, the prescriber should be ready to provide an answer key.

E-prescriptions may be legible, but they often still require translation by pharmacy staff before they are ready to go on a patient label. Prescribers can free-text patient SIGs, using abbreviations and medical jargon. A 2021 study of data from a U.S. mail-order pharmacy found that pharmacy staff edited 83.8% of all e-prescription directions.[56] These edits improved readability from an 11th or 12th grade level to a 4th grade level, while resolving 79.5% of quality issues identified by the study's authors.[56]

To perform this vital task with ease and quickly generate accurate, straightforward medication labels, become an expert in translating SIG codes. Several websites, including *Pharmacy Times*, have free resources for learning SIG codes and practicing their rapid translation.[57] This improves processing speed before fingers even move, optimizing both efficiency and patient safety.

Use Repetition in Short Sessions

Sometimes pharmacy technician job postings include written proficiency and typing speed expectations, usually measured in WPM.[58] For most data entry roles, 25 to 35 WPM is a minimum, but 40 to 50 WPM is preferred.[59] Pharmacy data entry requires accuracy and speed, especially considering most pharmacies process roughly 20 prescriptions per hour.[60] As such, a practical typing goal for pharmacy personnel involved in data entry is 40-50 WMP with *high accuracy.*[59]

How can you achieve an average of 40-50 WMP with *high accuracy*?

The answer to that question starts with short, frequent practice sessions![61,62,63] Practicing 15 to 20 minutes per day, most days of the week, allows long-lasting habit building. Your practice time doesn't need to be all day, every day. Resting 12 to 24 hours between practice sessions allows time for your brain to translate the skill into muscle memory.[18,19] But your practice time needs to be consistent – that's the key here!

Consistency matters more than session duration.[59,61,63] Practicing for 15-20 minutes each day has greater impact on skill retention than a single, long practice session once per week does. However, practice sessions should still be long enough to be meaningful – just a few minutes of practice here and there is unlikely to have the same impact as sustained 15-20 minute practice.[64] With consistent practice most days of the week, it still takes about one to three months to reach a 40 to 50 WPM goal.[64, 65,66]

In addition to consistency, the *quality* of practice matters, too. High-quality practice uses structured feedback, which focuses on targeted improvement.[67,68] Structured feedback includes three components:

1. Clearly define the skill you want to practice. Be as specific as you can. "Accurately enter prescription directions" is a better, more specific goal than "practice typing."
2. Identify the gap between your current skill level and your desired skill level. Perhaps your accuracy drops when entering drug names with similar spellings. Or maybe your speed falls when entering numeric doses. Whatever the issue is, identify it so that you can work on it.
3. Make a specific, measurable action plan for improvement! This will help you close the gap between your current skill level and your desired skill level. Perhaps your plan is "slow down during drug name entry and double check before continuing" or "practice the numeric keypad for five minutes daily." Whatever your plan is, follow through with it!

A **PRO TIP** is to choose one specific skill you want to work on, identify what is holding you back, and follow through with an action plan to improve.

Practice with pharmacy-related content (NDC numbers, prescription directions, patient demographics, etc.) rather than generic typing exercises.[69] Greater familiarity with pharmacy terminology leads to improved speed and accuracy over time. Get comfortable using your numeric keypad. Efficiency with the numeric keypad will support your overall typing accuracy and speed.[70] (Refer to the section on the numeric keypad for tips and tricks to do this!)

CONCLUSION

Accurate typing and data entry are essential pharmacy skills. The good news is that typing accuracy can be improved through deliberate practice. Techniques such as touch typing, chunking, numeric keypad training, error review, and repeated exposure to common pharmacy terminology help build speed, confidence, and accuracy over time. As correct habits become automatic, efficiency naturally improves. Remember: accuracy comes before speed. By practicing consistently and learning from mistakes, pharmacy technicians can strengthen their skills, support patient safety, and become more effective members of the pharmacy team. As typing instructors often say, practice makes permanent.

Figure 1. Taking Time to Type with Tenacity

Best

1. **Be COMMUNITY CHAMPIONS** and talk about typing skills and associated errors; use that informaion to address prevention
2. **Encourage discussion** with coworkers about how your team handles heavy workloads and various degrees of typing skill
3. **Be deliberate in your practice sessions**, and use the techniques learned her to handle distractions and common errors

Better

1. **Work with your team** to identify employees who need better typing skills
2. **Track your frquent errors** and use proven techniques to prevent them from happening again
3. **Assess your workplace** for ergonomic issues that are easily corrected

Good

1. **Wok on basic spelling skills** so you know how to spell common drug names
2. **Voluntarily relinquish the typists seat** if the prescription volume increases and you are making errors
3. **Remember that Accuracy trumps speed** every time.

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