



Guidelines for Creating High-Quality Electronic Prescriptions
In The Ambulatory Healthcare Setting

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The purpose of a medication prescription—regardless of its mode of transmission—is to convey to the pharmacist and the patient the clinician’s therapeutic intent in an accurate, understandable, complete, unambiguous, and efficient manner. Although this concept might seem obvious, it is a fact that many prescriptions do not meet these five criteria, and thus can become problematic to patients and the medical professionals who are caring for them. As is stated in an early edition of a highly regarded pharmacology textbook¹:

The most carefully conceived prescription order may become therapeutically useless, however, unless it communicates clearly with the pharmacist and adequately instructs the patient on how to take the prescribed medication.

This document has been created to help educate prescribers and their staffs, as well as the e-prescribing and electronic medical record software vendors that serve them, about key principles and best practices that should be kept in mind as they write prescription orders, and more specifically, new electronic prescriptions. Community pharmacists and their staffs will also find this document to be a useful educational resource for both themselves and their local prescribers.

In highlighting key principles and best practices, the focus of this document is on ensuring that electronic prescriptions that are received by pharmacies meet all of the criteria outlined in the first paragraph. In other words, this document defines the desired outcome of e-prescribing with respect to quality. A subsequent document will be published that will address issues such as root-cause analyses of e-prescriptions that do not meet these guidelines, as well as outline preventative and corrective measures to mitigate any problems that such analyses identify.

What Prescription Data Elements Are Required By Law?

The form in which prescriptions must be written is dictated primarily by state laws and regulations, typically those created by state boards of pharmacy. The exception to this rule is that the federal Controlled Substances Act of 1970 (CSA), along with supporting regulations promulgated by the

¹ Goodman & Gillman. *The Pharmacologic Basis of Therapeutics*. McGraw Hill Medical. Seventh Edition. (G&G)

Drug Enforcement Administration (DEA), dictates the form and legal manners of transmission of controlled substance prescriptions. In most cases, state controlled substance rules are consistent with the CSA, but in those cases in which they are not, it is the stricter rules that prevail. It is important to note, however, that shortly before the publication of this document, the DEA adopted regulations that allow controlled substance prescriptions to be transmitted by totally electronic means. The potential effects of this new rule on the quality of electronic prescriptions will be addressed in a future version of this document.

Although board of pharmacy rules vary significantly from state to state, one area of relative consistency is the set of data elements required to be on prescriptions. The following list, which is taken from National Association of Boards of Pharmacy (NABP) model rules², is very representative of the prescription data elements required in the vast majority of states:

- 1) Full name and street address of the patient;
- 2) Name and address of the prescribing practitioner (some states also require the Drug Enforcement Administration (DEA) registration number of the prescribing practitioner);
- 3) Date of issuance;
- 4) Name, strength, dosage form, and quantity of drug prescribed;
- 5) Directions for use;
- 6) Refills authorized, if any; and
- 7) Signature (if a written prescription drug order, prescribing practitioner's signature; if an electronically transmitted prescription drug order, prescribing practitioner's electronic or digital signature).

From a general standpoint, the only information that is required is that which pertains to the patient, the prescriber, and the medication being ordered. In the world of paper health records, this information is all that is needed in order to properly dispense a prescription.

What Additional Prescription Data Elements Are Required in the Electronic Environment?

There are other data elements that are needed in order to enable the electronic exchange of prescription information beyond what is required by state and federal laws and regulations. These additional data elements were agreed to by a consensus standards development effort among the various stakeholders involved in the e-prescribing industry, and it is the industry itself that enforces

² Section 3(a) of the August 2009 NABP Model State Pharmacy Act and Model Rules.

these requirements. A list of these data elements can be found in the latest version of the Surescripts Implementation Guides³, which are based upon the National Council for Prescription Drug Programs (NCPDP) SCRIPT Standard. NCPDP SCRIPT is the standard that facilitates the transmission of e-prescriptions in the ambulatory healthcare setting in the U.S.

These additional required data elements include the:

- Store (pharmacy) name, street address, telephone number, and NCPDP ID,
- Prescriber phone number and unique e-prescription network ID, such as the Surescripts Provider Identifier (SPI) or other unique identifier assigned by vendor or network,
- Patient date of birth and gender,
- Representative National Drug Code⁴ (NDC) number, unless the item does not have one assigned. (Important note: Representative NDCs are not meant to dictate to the pharmacist the exact product to be dispensed. Rather, they are provided to assist the pharmacist in understanding the prescriber's intent with respect to drug product selection.), and
- Product/service substitution codes, which indicate whether or not generic substitution is allowed by the prescriber.

Further, for the sake of completeness, it should be mentioned that the electronic environment also allows for the transmission of several useful but optional data elements such as:

- Additional patient information such telephone number(s),
- Additional prescriber information such as the National Provider ID or NPI (which the Center for Medicare and Medicaid Services requires as an identifier on Medicare Part D e-prescriptions), fax number and supervisor or prescriber agent identity (when required by state rules),
- Additional prescription information such as diagnosis expressed as ICD-9 or ICD-10 codes⁵, days supply, prior authorization code and Free Text (commonly referred to as the "Notes" field).

³ The guidance in this document is based upon the Surescripts implementation of the NCPDP SCRIPT Standard.

⁴ "An 11-digit NDC code that depicts a category of medication exclusive of package size and manufacturer/labeler. A representative NDC should not be a repackaged NDC, obsolete NDC, private label NDC or unit dose NDC unless it is the only NDC available identifying that category of medication." NCPDP External Code List, October 2009.

⁵ According to G&G, Eleventh Edition, "The single most important measure to prevent dispensing errors based on sound-alike or look-alike drug names is for the physician to provide the patient's diagnosis on the prescription order."

- Pharmacy eligibility response information for the patient, such as PBM/payer unique member ID, cardholder ID/name, and group ID, which can assist pharmacies to process e-prescriptions more efficiently.

When prescribers provide the necessary information as intended in the mandatory and optional (when pertinent) data element fields as outlined above, in a clear, complete, and unambiguous manner, the pharmacist has all the information needed to properly and safely dispense a prescription and counsel the patient on its use.

Unfortunately, over time, industry experience has shown that not all prescribers and their staffs understand all of the nuances and potential pitfalls of providing this information in an effective manner using the e-prescribing technologies at their disposal. In addition, some e-prescribing applications and electronic medical records systems appear to contribute to the creation of less-than-effective e-prescriptions, perhaps due to suboptimal user interfaces and/or poor user training. The following are guidelines for entering information when creating and transmitting e-prescriptions so as to optimize their value and avoid potential e-prescribing pitfalls.

Proper Entry of Prescription Data in the Electronic Environment

In most cases, the correct entry of the required and optional information into electronic prescribing data fields is straight forward and is not subject to improper use. As long as the information is accurate, correctly spelled, and entered into the appropriate field that was designed for said information, the result should be satisfactory. The following is a discussion of data fields that are included in this category.

Category I—Full and Accurate Information Required.

- Patient: Full given name, street address, city, state, zip, telephone number(s), date of birth, and gender.
 - The NCPDP SCRIPT Standard allows the input of additional information such as “Name Prefix,” “Middle Name” and “Name Suffix”. This information should be populated in the designated fields and should not be included with the first or the last names.
 - Example: Mr., John Doe, 7111 Rock Creek Road, Alexandria, VA, 22315, (703) 765-4321, DOB 11/01/80, M.
- Prescriber: Full name, name suffix, address, telephone number, fax number, unique e-prescription network ID (e.g., SPI), NPI, electronic signature (which is added in the background by the e-prescribing application) and, if required by laws or regulations, DEA registration number as well as supervisor or prescriber agent identity.

- The same comment with respect to additional name information fields mentioned above also applies here.
- Example: Kent McCowsky, M.D., 300 Center Fairway Drive, St. Paul, MN, 55102, T: (651) 707-7007, F: (651) 707-7008, SPI: 6216216216211, DEA: AM-9879872.
- Pharmacy: Store name, street address, telephone number(s) and NCPDP ID.
 - It is often helpful to include both the pharmacy's telephone and fax number. Up to three pharmacy telephone numbers with qualifiers are permitted by the NCPDP SCRIPT Standard.
 - Example: True Quality Pharmacy, 100 Accuracy Court, Los Angeles, CA, 91111, T: (818) 550-5000, F: (818) 550-5001, NCPDPID: 4324324.
- Prescription: Date of issuance (i.e., date written) and product/service substitution codes (to indicate whether or not generic substitution is permitted).
 - It is important that proper product/service substitution codes be used on e-prescriptions. Prescriber application vendors should take care to ensure that their applications guide users to insert the proper codes that accurately express their wishes with respect to generic substitution.
 - Example: Product/Service Substitution Code = "1", meaning substitution is not allowed by the prescriber on prescriptions that they want to ensure that the brand name is dispensed.
- Prescription: Days supply
 - Days supply must be accurate and not contradictory with Sig and/or quantity values. Prescriber application vendors should take care to ensure that their applications guide users to insert proper numeric value that accurately expresses their intent.
 - Example: The Sig is "One tablet four times daily," the quantity is "40," so the days supply must be "10".

On the other hand, experience has shown that a number of prescribing data fields are particularly susceptible to improper use. The remainder of this document is devoted to explaining the proper use of these data fields.

Category II—Prescription Data Elements Requiring Extra Care and Attention When Input.

(1) Guidelines that apply to name, strength, dosage form, and quantity of drug prescribed as well as the directions for use (the "Sig")

- Drug names should be spelled out in full, avoiding the use of abbreviations.
 - While it might be possible to make the case that abbreviations save time in the world of paper prescriptions, no such time savings accrue in the electronic world in which the prescriber simply picks a medication from a drug database.

- Abbreviations can lead to a misinterpretation of the prescriber's intent, which can result in medication errors.
- Examples:
 - Use "Hydrochlorothiazide 50 mg" instead of "HCTZ 50 mg."
 - Use "Zidovudine 300 mg" instead of "AZT 300 mg."
- Drug descriptions should include complete name, strength, strength units and dosage form information (if applicable) in the same exact order, and all should appear in one drug description field.
 - Not doing so causes problems in pharmacies due to missing data components.
 - It is preferred that either the generic or the brand name be used in the drug description, but not both. Using both unnecessarily complicates the information in the drug description field.
 - Examples:
 - Use "Doxycycline Monohydrate 50 mg oral capsule" instead of "Doxycycline caps."
 - Use "Ciprofloxacin 500 mg tablet" instead of "Ciprofloxacin tablet 500 mg."
 - Use "Atorvastatin calcium 20 mg tablet" or "Lipitor 20 mg tablet" instead of "Lipitor (Atorvastatin calcium) 20 mg tablet."
- Drug descriptions for generic products should use the naming conventions found in the Food and Drug Administration's "Orange Book: Approved Drug Products with Therapeutic Equivalence Evaluations."
 - This helps pharmacists to accurately choose the product to be dispensed when brand names are not used.
 - Examples:
 - Use "Glipizide 10mg tablets, extended release" instead of "Glipizide TAB OSM 24 10mg."
- Drug strength information should be consistent across all fields in which it appears.
 - The strength in the drug description should match that in the drug strength field.
 - Drug strength units in the drug description should match those in the drug strength units field. Drug strength units should not be sent in the drug strength field.
 - Example of improper use: The drug description is "Amoxicillin 500 mg oral capsule" and the drug strength field contains the value of "250."
- Dosage form codes should match the forms sent in drug description fields.
 - Example of improper use: The drug description is Amoxicillin 500 mg capsule and the dosage form code field contains "10," which is the NCPDP code that stands for tablet.

- All orders should be written using metric measurements of weight (e.g., mg, gm and kg) and volume (e.g., ml)⁶.
 - The apothecary and avoirdupois systems of weights and volumes are no longer considered appropriate in the world of pharmaceuticals.
 - Example: Use “Aspirin 81 mg” instead of “Aspirin 1 ¼ grains.”
- A zero should be used before a decimal (use 0.X mg instead of .X mg), but not after (use X mg instead of X.0 mg).
 - Trailing zeros are particularly dangerous in that they can lead to ten-fold overdoses. Thus, trailing zeros should never be used.
 - Examples:
 - Use “Digoxin 0.25 mg” instead of “Digoxin .25 mg.”
 - Use “Haloperidol 5 mg” instead of “Haloperidol 5.0 mg.”
- Arabic (decimal) numerals are preferable to Roman numerals, and in some instances it is preferable for numbers to be spelled out.
 - Example: Use “Aspirin 325 mg” instead of “Aspirin V grains.”
- Other specific abbreviation issues:
 - The term “microgram” can be abbreviated as “mcg,” but it should not be abbreviated as “µg,” which can easily be mistaken for the abbreviation for “mg,” standing for “milligram.”
 - The word “unit” should be spelled out and never abbreviated as “U” or “u.”
 - “M” should not be used as an abbreviation for thousands (e.g., 5 M units), as it has been mistaken as meaning one million.
 - Do not use commas when expressing thousands as they might be misinterpreted as periods.

(2) Issues related specifically to the Sig field or directions for use.

- The directions for use should not be split between the Sig and Notes fields.
 - Depending upon the design of the pharmacy system and/or the effectiveness of the training of pharmacy personnel, splitting directions between the Sig and Notes fields can result in part of the directions being missed, thereby preventing complete

⁶ “The metric system should be used in place of common household measurements such as “dropperful” and “teaspoon” in the directions for the patient, and both the doctor and the pharmacist should be sure that the patient understands the measurement prescribed. For medical purposes, a “teaspoon” or “teaspoonful” dose is considered to be equivalent to 5 ml and a “tablespoon” to 15 ml, but the actual volumes held by ordinary household teaspoons and tablespoons are far too variable to be used reliably for measurement of medications. Prescribing oral medications in “drops” likewise can cause problems when accuracy of dose is important unless the patient understands that only the calibrated dropper provided by the manufacturer or pharmacist should be used to dispense the medication.” G&G, Seventh Edition.

directions from being conveyed to patients. Patients may experience significant negative therapeutic outcomes when this occurs.

- Examples of improper use:
 - Sig field—“Take one tablet daily,” Notes field—“Take only on Monday, Wednesday and Friday.”⁷
 - Sig field—“Dissolve one tablet under the tongue every 10 minutes for chest pain,” Notes field—“Call physician immediately if relief is not obtained after three doses.”
 - Sig field—“Apply and rub well into affected area twice a day,” Notes field—“Discontinue use and call physician if rash worsens.”
 - Sig field—“One drop to eye having surgery three times daily,” Notes field—“Start two days prior to surgery.”
- Information in the Sig field should not conflict with information in the Notes field.
 - Conflicting information in these fields usually requires pharmacists to contact prescribers to ascertain their actual intent with respect to the directions, which compromises the efficiencies related to e-prescribing.
 - Inconsistent information in the Sig versus the Notes fields can result in incorrect directions being conveyed to patients.
 - Example of improper use: Sig field—“1 cap orally 3 times a day”, Notes field—“One capsule by mouth daily.”
- Care must be taken so that Sigs are not truncated because important information can be lost.
 - Example of improper use: “Take 1 tablet once a month in the am 1 hr before eating or drinking, with 1 C water. Remain upright x 1 hour and nothing by mouth, then resu”
- Sig information should be clinically correct.
 - Example: Use “Amoxicillin 500 mg Oral Capsules”—Sig “One capsule three times a day” instead of “500 caps 3 times a day.”
- Directions for use should be spelled out clearly in proper English.
 - Since the pharmacist must interpret—and nearly always writes—the label in English, the use of abbreviations (particularly Latin) or symbols is unnecessary and discouraged because it can lead to medication errors.
 - Example: Use “Take 1 tablet by mouth twice a day” instead of “1 T PO BID.”

⁷ This is an actual example from a warfarin e-prescription, which if not taken according to the complete directions, could possibly result in serious patient harm.

- Information in the Sig field should be limited to the Sig.
 - Quantity to be dispensed should not be placed in the Sig field.
 - Example: Use “One capsule by mouth three times daily” instead of “One capsule by mouth three times daily – Disp # 30.”
 - Duration of therapy should not be placed in the Sig field.
 - Example: Use “One capsule by mouth four times daily” instead of “One four times daily – Disp 10 day supply.”
 - Drug description should not be placed in Sig field.
 - Example: Use “One capsule by mouth at bedtime” instead of “One by mouth at bedtime– Paxil CR 20 mg.”
 - Example of improper use:
 - "One drop to eye having surgery three times daily. Start two days prior to surgery. May substitute Acular LS, Xibrom, or Voltaren if less expensive." (i.e., the indication of alternative approved drugs “May substitute Acular LS, Xibrom, or Voltaren if less expensive” should be placed in the Notes field.)

- Sigs should be complete, properly formatted, and not repeated.
 - Sig should be complete.
 - Example: Use “Apply topically to forearm three times a day” instead of “Topical each day.”
 - Sig should be properly formatted.
 - Example: Use “Take one capsule three times a day” instead of “1 3 times a day.”
 - Sig should not be repeated.
 - Example: Use “Take one capsule daily” instead of “1 PO QD – Take one tablet every day.”

- The inclusion of the intended use or the indication for the medication in the directions for use is helpful to patients, pharmacists and other prescribers, and is strongly encouraged.
 - Intended use can help patients to organize and better understand their medications and why they are taking them.
 - Including the indication in the Sig field can help prevent dispensing errors, and it provides pharmacists with a foundation for patient counseling and medication therapy management.
 - Other prescribers may find the indication helpful when a patient brings their medication bottles with them to office visits.
 - Example: “Take according to instructions in dosepak for poison ivy rash.”

- The instruction “take as directed” is rarely appropriate and should be avoided by prescribers.
 - Such an instruction assumes an understanding on the part of the patient that may not exist, and even if it does, will very likely be short lived.

- Using the term “take as directed” provides little information upon which the pharmacist can base their counseling of the patient.

(3) Proper use of the Notes field (referred to as “free text” in the NCPDP SCRIPT Standard).

- Prescription information that has a designated, standardized data field should not be placed in the Notes field.
 - For example, neither the drug name, strength nor quantity should be placed in the Notes field because there are specific fields in the NCPDP SCRIPT Standard for these data elements. This is important because if this information isn’t placed in the fields in which pharmacy personnel are trained to look for it, it might be missed.
- Reserve use of the Notes field for information related to, but not part of, the prescription.
 - For example, a comment such as: “Please have the patient call the office when they have finished taking this prescription” would be an appropriate use of the Notes field.
- To reiterate, as mentioned above, the directions for use should not be split between the Sig and Notes fields nor should the information in the Sig field conflict with information in the Notes Field.
 - The former can lead to critical information being missed by pharmacy personnel and possibly not being transmitted to the patient, and the latter normally requires pharmacists to contact the prescriber to clarify their intent, thereby compromising the potential efficiencies of e-prescribing.

(4) Refills authorized, if any

- Although allowed both by convention and NCPDP SCRIPT, the indication of “PRN” (refill as needed) is not considered to be good practice and should be discouraged.
 - Example: Use “Refill 11 times” instead of “Refill PRN.”

(5) Other items unique to electronic prescribing.

- Representative NDC number requirements.
 - Representative NDC numbers, which contain 11 digits, must be correct, as incorrect representative NDC numbers may cause drug identification problems in the receiving pharmacies.
 - Representative NDC numbers must be current and included in e-prescription messages unless the items do not have assigned NDCs.

- Quantity Qualifiers must be correctly associated with drug descriptions.
 - Correct mapping procedures are available in the Units of Measure table, which can be found in the NCPDP External Code List and the Surescripts Implementation Guides.
 - Where possible, quantities should reflect the actual metric quantity to be dispensed.
 - Example: Use “Amoxicillin 250mg/5ml, 150 ml” instead of “Amoxicillin 250mg/5ml, 1 bottle.”
 - The use of “ZZ”, “EA” and “00” should be limited to instances in which none of the available qualifiers in the Units of Measure table can be applied.
 - Examples of improper use: Drug description—Amoxicillin 500 mg Oral Capsule, Quantity 30 and Quantity Qualifier sent “ZZ”—mutually defined, “EA”—each or “00”—unspecified instead of “AV”—capsules.

Conclusion

The widespread adoption of electronic prescribing promises to improve the safety, quality and efficiency of the prescribing process in the U.S. In order for the technology to deliver on this promise, e-prescribing systems must be designed correctly by vendors and used properly by prescribers and their staffs. If the information input into e-prescribing devices is accurate, appropriate and in the proper fields, high-quality e-prescriptions should be the result. Accurate, safe, and high quality dispensing and outcomes follow. Adhering to the guidelines above should assist the users of e-prescribing technology to generate prescription information properly, thereby achieving this end.

Finally, this is meant to be a living document that reflects the changing needs of the e-prescribing industry over time. As such, Surescripts welcomes any comments, constructive criticisms, and updates that readers would like to share for potential inclusion in future versions. Please forward any such input to quality@surescripts.com. Thank you.

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