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Description of a tall-man lettering program for look-alike and sound-alike antineoplastic agents

Tall-man (i.e., mixed-case) lettering is used to highlight dissimilarities in look-alike and sound-alike (LASA) drug names.[1] Studies have shown that emphasizing definitive sections of drug names using capitalized letters can help distinguish between similar looking and sounding medications (e.g., vinBLAStine, vinCRIStine), making them less prone to mistake for one another and thereby reducing medication errors.[2,3] Despite the benefits of tall-man lettering and its endorsement by the Institute for Safe Medication Practices, Food and Drug Administration, Joint Commission, and National Association of Boards of Pharmacy, there is a lack of definitive standard guidance regarding its use.

Memorial Sloan Kettering Cancer Center (MSKCC) is a tertiary facility solely devoted to the prevention, treatment, and care of patients with cancer and associated diseases. Antineoplastic medications make up a significant part of MSKCC's formulary. Chemotherapies, biologicals, and targeted drugs are typically named to represent their chemical or biological origin or mechanism; therefore, antineoplastic drug names tend to be very similar. In addition, these agents frequently have similar clinical indications, rendering it challenging to employ indication-based strategies to automatically detect LASA medication errors.[4] Confirmation bias, as it relates to healthcare, is the selection of medications based on familiarity with the drugs and their effects.[5] Confirmation bias often occurs with LASA agents and with medications within the same therapeutic categories.

When developing MSKCC's LASA naming strategy, we chose to exploit the chemical and pharmacologic roots of generic drug names and minimally apply tall-man lettering. Grouping the LASA drug list by therapeutic categories (i.e., chemotherapy, monoclonal antibodies, and oral targeted agents) creates a more concise list that we believe is more user-friendly. Agents within the same therapeutic class are color coded on educational charts to helps clinicians visually discern the differences among drug names that have a high potential for confusion.

The table provided shows how MSKCC applies tall-man lettering to differentiate the names of oral targeted agents. The naming methodology uses the generic name stems listed by the National Library of Medicine. Stems for therapeutic categories include *-tinib* for tyrosine kinase inhibitors, *-zomib* for proteasome inhibitors, and *-ciclib* for cyclin-dependent kinase inhibitors. Drugs with the same stem are grouped together, and tall-man lettering is applied on the nonstem part of the drug name. Examples include ERLOtinb, NILOtinib, and IMAtinib. Various patterns of capitalization are applied to further differentiate the agents (e.g., deBRAfenib, daSAtinib).[6]

Although a recent study by Zhong et al.[7] suggested that tall-man lettering is not an effective strategy for preventing LASA errors, this study had numerous limitations. For example, Lambert et al.[8] pointed out that there was no documentation of whether tall-man lettering was actually in use

Table. Tall-Man Lettering Standardization Schema for Oral Targeted Agents

Stem	Drug Class	Example
-tinib	Tyrosine kinase inhibitor	IMAtinib
-ciclib	Cyclin-dependent kinase inhibitor	PALBOciclib
-inostat	Histone deacetylase inhibitor	VORinostat
-parib	Poly ADP-ribose polymerase inhibitor	OLAparib
-fenib	BRAF kinase inhibitor	VEMURAfenib
-degib	Hedgehog pathway inhibitor	VISMOdegib
-lisib	Phosphatidylinositol 3-kinase inhibitor	IDELAlisib

in the study hospitals and of how it was used. Successful avoidance of LASA errors using tall-man lettering relies heavily on how the LASA list is used and implemented. In addition, the 12 pairs of LASA drugs evaluated by Zhong et al.[7] were nonantineoplastic agents and the findings may not be applicable to institutions such as MSKCC, where a significant percentage of the drug doses dispensed are antineoplastic agents.

Application of tall-man lettering can be found in all parts of the medication management system at MSKCC (formulary management, pharmacy storage, pharmacy computer drug selection screens, computer-generated pharmacy labels, shelf labels, automated dispensing cabinet screens, computer-generated medication administration records, smart pump libraries, patient labels) to enhance the safe use of antineoplastic agents.

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