

# Display of Japanese Language Features within eCOA Measures: Challenges and Recommendations

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## OBJECTIVE

According to the World Health Organisation, after the US and China, Japan is home to the third highest number of clinical trials in the world<sup>1</sup>. In fact, the number of trials being conducted in Japan increased by over 6,000% from 2001 (n=83) to 2017 (n=5,305). As a result of this, the use of Japanese Clinical Outcome Assessments (COAs) has become increasingly commonplace. The objective of this study was to describe and analyse two of the main challenges associated with the display of Japanese language features in electronic COAs (eCOAs) and present recommendations for their resolution.

## BACKGROUND

When it comes to the display of Japanese language features in eCOAs, there are two significant display challenges centred around Kanji, the characters which originated from Chinese and were adopted into the Japanese writing system. The first of these challenges is that Kanji are often displayed in fonts that use Chinese strokes (e.g. MingLiu, SimSun). Although these are recognizable to a Japanese audience, these strokes mean that the Kanji appear vastly different to how they would be expected to display and are considered “incorrect” in Japanese.

English	Kanji (Japanese)	Chinese Equivalent
Back	戻る	戻る

The second challenge is that less-common Kanji (such as those found in more specialized COAs) rely on another Japanese language feature (Furigana) to ensure they are correctly understood by their intended audience. Furigana are phonetic aids used to help understand less-common Kanji and they would normally appear above the Kanji they clarify (known as “ruby text”). However, in eCOAs, Furigana are often displayed as parentheticals:

English	Correct Display	Incorrect Display
In the last two weeks	この2週間 <sup>しゅうかん</sup> で	この2週間 (しゅうかん) で

Whether or not the resulting display is entirely understandable to the intended audience depends on how much the incorrectly placed Furigana disrupt the readability of the resulting text. As such, consideration should be given to ensuring the appropriate display of Japanese eCOAs, as improper display may impede comprehension and interfere in accurate data collection.

## METHODS

Display data was analysed from a convenience sample (n=7) of translation projects recently completed by RWS Life Sciences. All projects in the convenience sample met the inclusion criteria of the COAs being administered to patients electronically and having Japanese in scope. Each project contained multiple COAs and the sample spanned a total of four eCOA Providers.

The convenience sample was reviewed to determine if the COAs in the sample exhibited either Kanji characters or Furigana in the electronic display of the Japanese translations. Then it was determined, with the help of native Japanese COA experts in the RWS Life Sciences team, whether Kanji were displayed correctly using Japanese strokes as opposed to incorrectly with Chinese strokes. Also, where Furigana was present, it was recorded whether this feature was displayed correctly as ruby text or incorrectly as a parenthetical embedded within the sentences themselves.

## RESULTS

In four of the seven projects, it was discovered that Kanji were displayed incorrectly using Chinese fonts. However, there was no consistency between eCOA Providers as to which Kanji displayed correctly and which did not.

In all seven projects, Furigana was recorded as displaying as a parenthetical instead of ruby text. In the convenience sample, there were no instances of Furigana being displayed correctly above their corresponding Kanji.

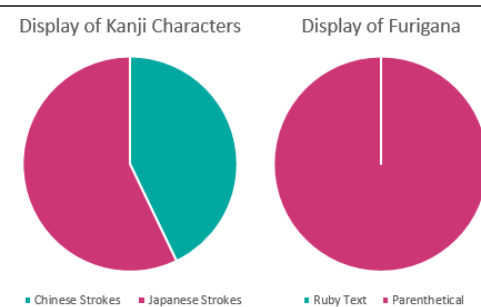


Figure 1

## DISCUSSION

Kanji appearing with Chinese strokes rather than Japanese strokes (which RWS Life Sciences found to be the case in 57% of our convenience sample) is often caused by Chinese and Japanese eCOA builds being programmed to use the same font. Where a character only appears in Japanese, the system displays the character correctly as there is no other option. However, where a character appears in both Japanese and Chinese (as is the case with Kanji), some fonts will use the Chinese version only meaning that the character displays incorrectly for Japan.

Although Kanji characters displayed using Chinese strokes are understandable to a Japanese-speaking audience, it's important to remember *how* a COA is interpreted can impact the way certain respondents will interact with it. Firstly, Japanese that contains Chinese characters does not feel correctly localised for the intended target audience. This can make the respondents feel that the questions being asked are not actually intended for them and, by extension, that their responses are less valuable. This may affect the way they choose to answer the questions. This same situation can arise when using French for France in Canada or using American English versions of COAs in the UK. Secondly, for political reasons, some Japanese respondents may be uncomfortable or offended by the use of Chinese characters; particularly by the suggestion that, by virtue of their inclusion in an eCOA intended for Japan, this is an appropriate way to display the Japanese language.

The solution to ensuring Kanji display correctly using Japanese strokes is relatively simple. RWS Life Sciences recommends ensuring that, when designing the software for each locale, the Japanese build uses a font specifically intended for Japanese. Although it is easy to understand why eCOA Providers would want to have as many locales as possible use the same fonts, this will help ensure that there are no display issues in the final product. Study and project timelines often do not allow for a build to be edited to change the font when these character display issues are identified at the end of the eCOA proofreading process.

Whereas incorrectly displayed Kanji are understandable, incorrectly displayed Furigana can make the resulting Japanese screens almost illegible. As Furigana usually appears above the Kanji it modifies, it functions as a non-invasive tool to assist the reader with understanding the intended meaning of the character in question. However, as found in 100% of the convenience sample for this study, it is very common for Furigana to appear as a parenthetical mid-word which can be very disruptive to the end reader. An extreme example in English to illustrate this would be “leukaemia” appearing as “leu(loo)kae(kee)mia(mya)”.

As with the Kanji font issue, RWS Life Sciences recommends that time is dedicated when building eCOA platforms to ensuring that ruby text such as Furigana can be supported. Ruby text can be incorporated into eCOA software using HTML ruby tags as shown in the table below<sup>2</sup>. These tags are supported by all major web browsers such as Chrome, Edge, Firefox, Safari and Opera<sup>3</sup>. As most eCOA builds are originally created in English with the COA text then being substituted for the target languages later in the process with few HTML tag updates, the need to add ruby markup is often overlooked, given that this is not a feature of English. However, due to the ease of implementation and the severe impact it can have on respondent understanding, we recommend that eCOA providers verify ruby tag functionality in their software, so that RWS can incorporate this markup when preparing Japanese translations for eCOA.

English	Correct Display	Incorrect Display
<b>On-Screen (patient-facing)</b>		
In the last two weeks	この2週間 <sup>しゅうかん</sup> で	この2週間 (しゅうかん) で
<b>Back-end (technical file)</b>		
<p>In the last two weeks</p>	<p>この2<ruby>週間</rt>しゅうかん</p>	<p>この2週間 (しゅうかん) で</p>

As an extension of the above recommendation to eCOA Providers, RWS Life Sciences also recommends that COA license holders and developers do not develop eCOA-specific versions of their instruments that show Furigana as parentheticals rather than ruby text. This can lead to confusion for eCOA Providers building the eCOA displays when their team members are not speakers of Japanese, and result in a display that is not customised to the target audience.

## CONCLUSION

The poor display of Japanese characters and workarounds with parenthetical text may interfere in the collection of accurate patient data. RWS Life Sciences recommends implementing a software solution to avoid the automatic default to Chinese strokes and to allow the correct placement of Furigana above Japanese characters via ruby markup. We also recommend working with COA developers to correct licensed instruments that include Furigana as parentheticals. Continued misuse of Chinese strokes and misplaced phonetic aids within Japanese eCOAs could result in difficulty for patients and on-site Clinical Research Associates (CRAs)



<sup>1</sup> Number of clinical trials by year, country, WHO region and income group (1999-2019) ([https://www.who.int/research-observatory/monitoring/processes/clinical\\_trials\\_1/en/](https://www.who.int/research-observatory/monitoring/processes/clinical_trials_1/en/))

<sup>2</sup> Tutorial: Ruby Markup and Styling, w3C (<https://www.w3.org/International/tutorials/ruby/en/all.html>)

<sup>3</sup> Summarized test results: HTML5, the ruby element and its children (<https://w3c.github.io/i18n-tests/results/ruby-html/>)