



# GMFM App<sup>+</sup>

## Tutorial

(Multi-User & Single User  
Versions)



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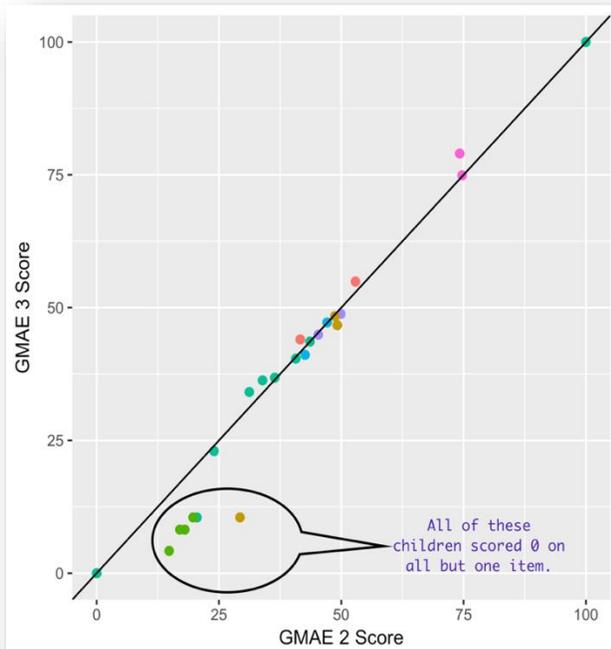
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## What is the GMFM App+?

This software is an application version of the Gross Motor Function Measure (GMFM), a clinical tool designed to evaluate change in gross motor function in children with cerebral palsy (CP). The app incorporates the original 88-item measure (GMFM-88) and the more recent 66-item measure (GMFM-66; including Item Sets and Basal & Ceiling), as well as five Motor Growth Curves describing patterns of motor development found among a sample of 650 children in Ontario with CP. The GMFM-66 relies on statistical programming known as the Gross Motor Ability Estimator (GMAE) to convert individual item scores to an interval level total score; the most current GMAE scoring algorithm (GMAE-3) is embedded in the application. The app can also be used to evaluate change in gross motor function over time or with intervention in children with CP. It can be useful in both clinical and research settings.

## New features of the GMFM App+

The GMFM App+ uses an updated algorithm (GMAE-3) to calculate GMFM-66 scores. Previously, the GMAE and GMAE-2 imputed a raw score based on the items tested and then converted this to a GMFM-66 score. The updated algorithm computes the GMFM-66 score directly from the item calibrations (item difficulty scores) that the child was tested on. The difference between the GMAE-2 score and the GMAE-3 score will generally be quite small. Discrepancies will tend to be smaller in the middle of the measure (scores between 25-75) and may be larger at the high and low ends of the measure. The largest discrepancies will occur when a child has a single non-zero score; when they score a 1, 2 or 3 on one item and zero on all the other items (see Figure 1). The standard error calculation in the GMAE-3 will likely be the most notable difference. The new standard error reflects the number of items tested and how likely each response was.



The GMAE-3 algorithm reflects a slightly more accurate measure of motor function than the previous algorithm for children with higher and lower functioning and should be the preferred measure moving forward.

The figure is a plot of both scores for a sample of 25 children. The number of items tested ranged from 8 to 66 with a median of 15. The black line represents perfect agreement between the scores.

**Figure 1: Score Plots**

## *Versions Available*

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There are 3 versions of the GMFM App+ being released:

- Multi-User (both PC and Mac)
- Single-User (both PC and Mac)
- Mobile (both Android and iOS)

The Multi-User version allows an organization to have an unlimited number of users. The Multi-User version acts as a server and can sync data from Single User or mobile versions (data can be synced across different devices and different operating systems e.g., iOS tablet to PC desktop)

The Single-User version was designed to be downloaded on one computer with one user.

The Mobile version is also designed to be downloaded on one device with one user. The biggest difference between the Mobile and Multi/Single-User versions is the inability to export data (you can only transfer or sync data to the Desktop version).

Below are the frameworks and softwares used in the development of the Multi-User and Single-User versions:

**Table 1: Softwares used for Development of Multi-User & Single-User Versions**

<b>Name</b>	<b>Version</b>
NodeJS	8.12
AngularJS	1.4.3
NSIS	3.03

## *System Requirements for Running the GMFM App+ on your Device*

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The GMFM App+ Multi-User and Single-User versions were designed to function on both Personal and Mac Computers. The following table indicates the amount of storage space necessary for running each product:

**Table 2: Storage Space for GMFM App+**

<b>Name</b>	<b>Size</b>	<b>Installer File Type</b>
Mac Multi-User	149 MB	.app
Mac Single-User	149 MB	.app

**Table 2: Storage Space for GMFM App+**

Windows Multi-User	291 MB	.exe
Windows Single-User	291 MB	.exe

**Minimum software requirements are as follows:**

**Table 3: Minimum Software Requirements**

Device	Operating System
PC	Windows 7/Server 2008 R2 or higher (ARM version not supported); Linux Flavors (Ubuntu 12.04 and later, CentOS, Fedora 21, Debian 8)
Mac	OSX 10.11.6 or higher (Only 64-bit binaries)

**Minimum hardware specifications:**

An intel Pentium 4 processor or later that is SSE2 capable for PC, M or Linux

### ***Downloading the GMFM App+ onto your Device***

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You will need administrator status on your computer to download the GMFM App+. If your computer is maintained by an IT department, it may be helpful to ask for administrator privileges prior to installation or have your IT department download the program for you.

Double click on the file and follow the prompts.

On the Port Selection page, if the Port does not say 'Port is open', you will need to try another Port number. For example, if TCP Port is closed for 9806, change the number to 9807 (or try any other consecutive number) and click on 'check port'. Once you have found a port that is open, click the next button.

On the components pop-up, ensure that all components are checked off (GMFM, Start Menu Shortcut and Desktop shortcut).

If a Modify C++ screen pop-up appears, you will either be instructed to install or modify. If the pop-up asks you to install, please install the software on your computer. If the pop-up asks you to modify, it is recommended to click on cancel.

## Logging In

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Once you have downloaded the GMFM App+ onto your device, you will need to register yourself as a user. To register, the following fields are mandatory to complete: first name, last name, username, password and confirm password. Passwords must be longer than 6 characters and contain at least one upper case character, one lower case character and one special character. To save your data, click on the green checkmark at the top of the pop-up window.

**NOTE:** On the Multi-user version, the first person to register will be considered the administrator for the account. The administrator has access to all data entered into the Multi-User version including names of therapists, all client information, and any data transferred or synced to the account.

You will be required to set 3 security questions (on first log in you will be prompted to complete your security questions). These questions will help you to log into your account should you forget your password. It is important to remember the answers to your questions as there is no email verification process built in.

## General usage

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Once you have logged into the program, you will land on your therapist profile page (see Figure 2). The GMFM App+ has both a left side bar and top bar to help you navigate through the program

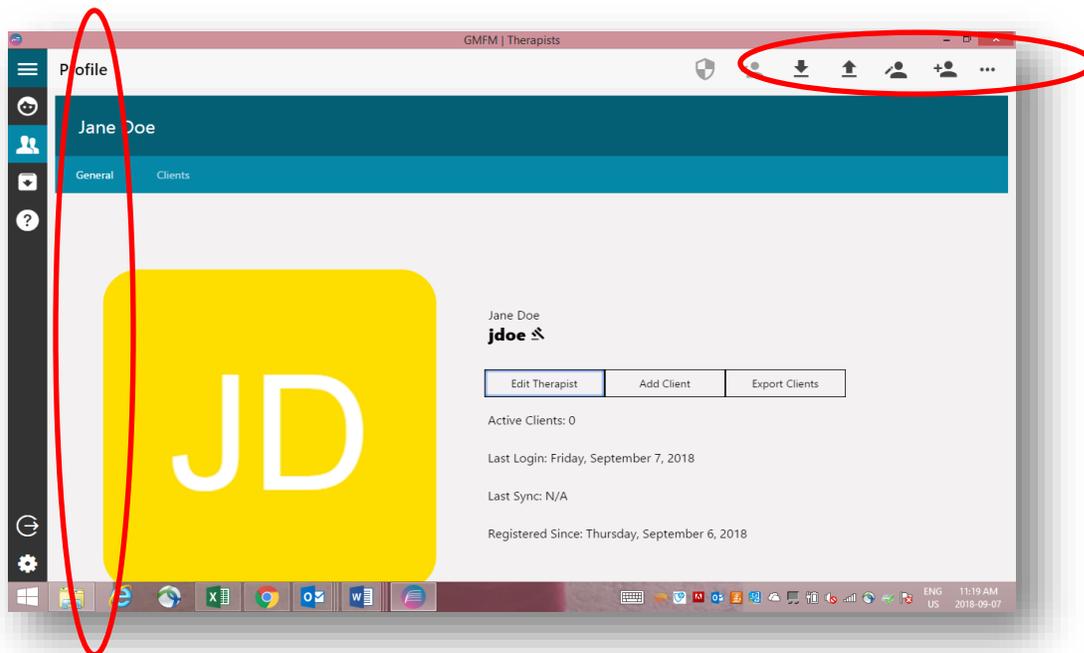


Figure 2: Therapist Profile Page

**The left side bar includes the following icons:**



Expand left side bar menu



Clients

**From the Client page you can:**

- View list of clients
- Manage clients (add, edit, archive)
- Add assessments
- Sync or share assessments from another device



Therapist(s)

**From this page you can:**

- Change your password
- Update your profile and security questions
- View/edit your clients
- Add/edit client assessments
- Import/export client data
- Multi-User only – add additional therapists



Archive client data (viewing archived clients/assessments)



Devices (Multi-User Version ONLY)



Access help, the tutorial and other helpful resources (including GMFCS Descriptors and Illustrations; GMFCS Expanded and Revised; Motor Growth Curves; Tabulated GMFM-66 Centiles; GMFM-66 and GMFM-88 Scoresheets; GMFM-66 Item Set Scoresheets; GMFM-66 Basal & Ceiling Scoresheets)



Sign Out



Settings

## ***Creating Additional Therapist Accounts (Multi-User Version ONLY)***

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From the administrator's account, click on add therapist  to add additional therapists to the account. The administrator will need to complete the "Create Therapist Profile" pop-up for each therapist added (information needed includes: First Name, Last Name, Username, Password and account type (i.e., therapist/admin OR therapist). The administrator will need to then provide the username and password assigned to each therapist created. NOTE: A therapist can (and should) change the password after assigned and upon first login. See Editing Therapist Profile section for instructions.

## ***Editing Therapist Profile***

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Once a Therapist account has been created, all of the information can be edited. To edit the Therapist

Profile, click on  "Edit Therapist" (or in the Therapist profile page click on "Edit Therapist"). Therapists whose accounts are created by an Administrator should edit their password to something that they will remember.

Editing Therapist profile may also be used if one is transferring an entire caseload of one therapist to another (e.g., in the instance of a therapist retiring or leaving the organization). The Administrator, in this case, can then go into the profile and change all information over for the new therapist.

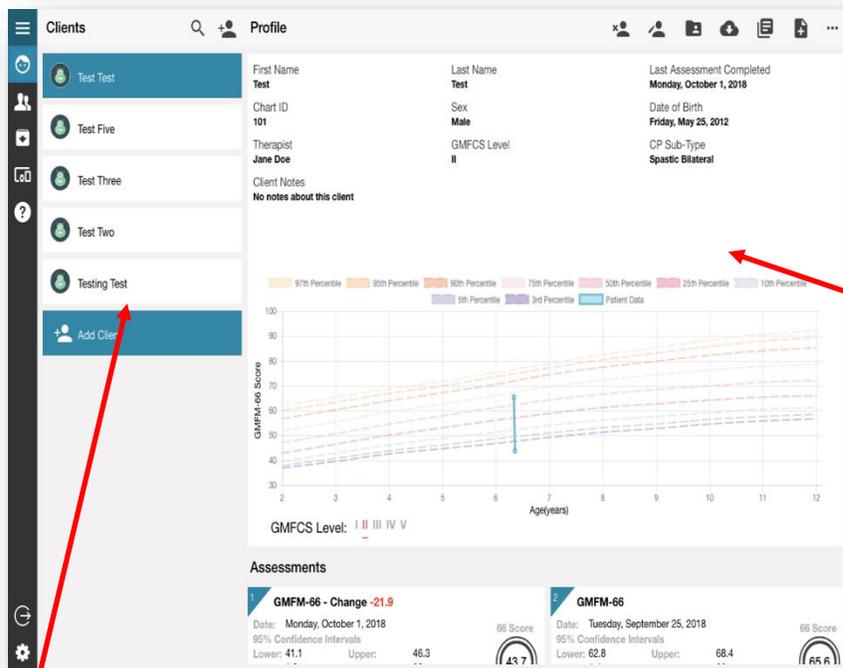
NOTE: An Administrator can delete a Therapist from the program by clicking on  (clicking "Delete Therapist") from the Therapist Profile page. When a Therapist is deleted from the program, all clients and their data will be moved to the archive folder.

## Creating Clients

To add a client, click on either  button to get to the client profile page (see Figure 3), (then +add

client button),  button at the top right-hand side of your screen or from the therapist profile page click on the button “Add client”. A client profile pop-up will appear, and you will need to complete all fields with an asterisk (\*). To save the profile, click on the green checkmark at the top of the pop-up screen.

NOTE: If you plan to sync data between a Single-User version and the Multi-User version, the client must be set up on both versions of the app and have the **same ID number**.



Client Detail Pane

Client List

Figure 3: Client Profile Page

## Editing Client

When in the client profile page () , click on  . A pop-up window will appear (Edit Client Profile) with all of the client details. You can then modify any/all data on this page.

Alternatively, from the Therapist Profile page, click on clients in the profile window, click on the client you



wish to edit. A view patient profile pop-up window will appear. You can then choose to edit the client profile.

## *Adding an Assessment*

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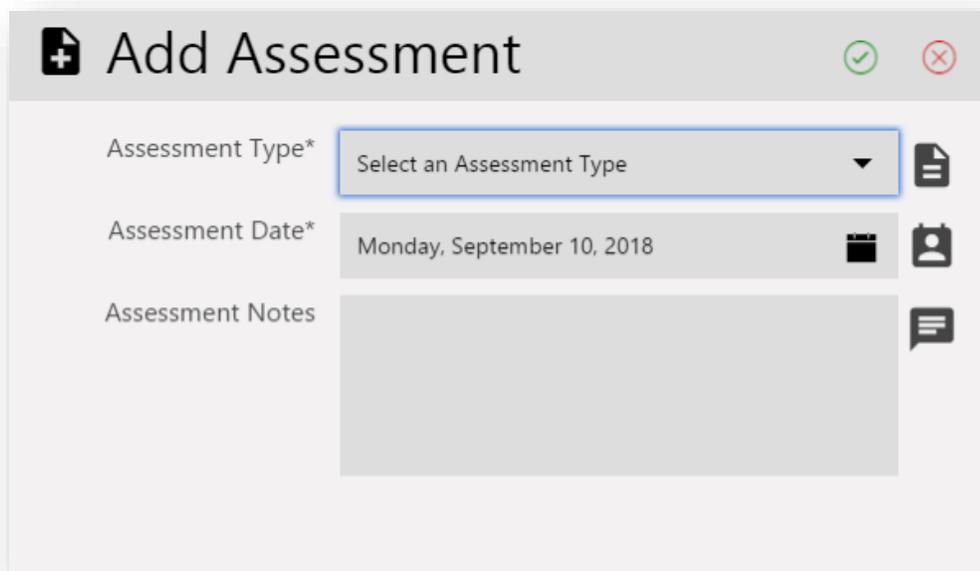
To add an assessment to a Client's profile page, you must first be in the Client window . From the list of Client names in the left column, click on the Client's name in which you want to add an assessment. The Client's name should now be highlighted blue and their profile will be shown in the right detail pane.

To add an assessment for this Client, either right click on their name and select "Add Assessment", click



on  on the top menu bar, or scroll to the bottom of the page (under the GMFM Curves and previous assessments completed) and click on "Add Assessment". An add assessment pop-up will appear (see Figure 4). If you choose the Item Sets, the system will ask the user to assess the child on up to 4 items prior to determining the appropriate Item Set to use. Finally, click on the green checkmark to save your selection.

The Assessment Date is automatically set to the current date. If you are entering an assessment from the past, please change the date here.



**Figure 4: Adding Assessment**

## Completing an Assessment

Once you have clicked on the green checkmark, the assessment for which you have chosen will automatically appear on your screen. The assessment will advance automatically once you have completed all items in the dimension (once you have completed all items in Dimension E - a pop-up screen will appear prompting the user to save their data). You can decide to save an assessment without completing all of the items. Any items that were not completed will automatically be saved as Not Tested.

## Assessment Summary

The Assessment Summary page (see Figure 5) will automatically be loaded once an assessment is saved. The page can also be found if you are on the Client Profile page and scroll to the bottom where the assessment tiles can be found (under the GMFM Curves). Click on the assessment you would like to view (which will then be highlighted blue).

The page is broken down into three parts:

1. Client information
2. Assessment details and score
3. Item maps (mapped by difficulty and order)

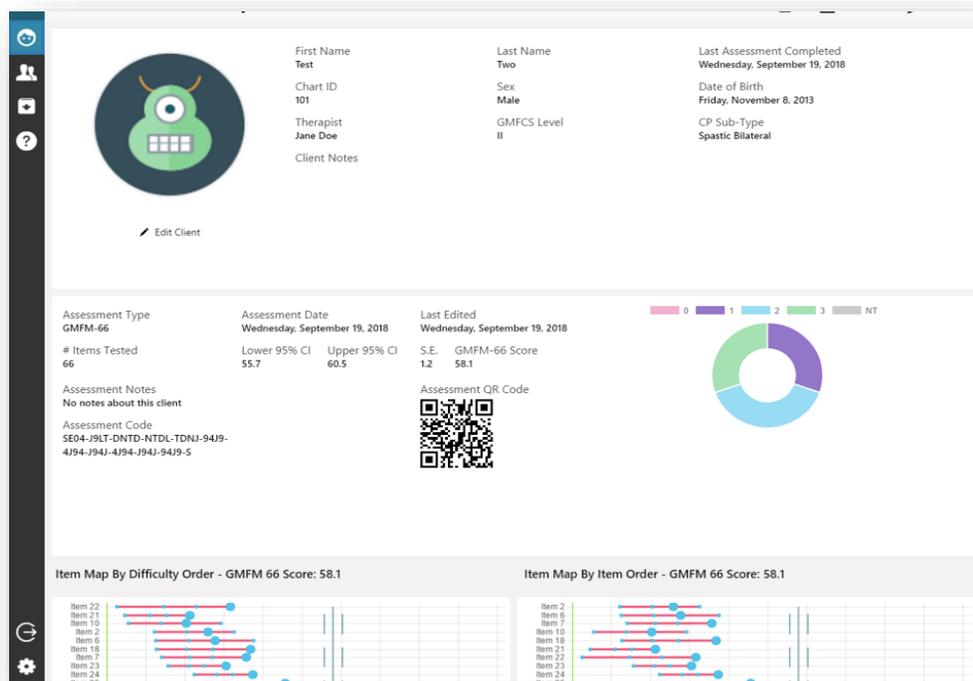


Figure 5: Assessment Summary

## Editing an Assessment



Should you wish to edit an assessment after saving, please click on the edit assessment button from the Assessment Summary page. In the edit assessment page, you can change the date of the assessment by clicking on the calendar icon at the top (middle) of the page. You can also change any of the item scores. Remember to click on the green checkmark at the top of the page to save your changes.

## Client Summary



To view the client summary page, click on  from the client profile page. On this page (see Figure 6), you will see the client information in the top window, all assessments entered into the app underneath in the left column and an Assessment Summary on the right. The Assessment Summary will graph all of your assessments however you must choose which assessments to graph (once selected by clicking on the assessment tile, the assessment will be outlined in blue and a blue dot will be mapped onto the GMFM Curves). NOTE: Make sure the correct GMFCS level is selected (the program should default to the level selected on registering the client). From this page you can print or generate a pdf (icons at top right of the screen).

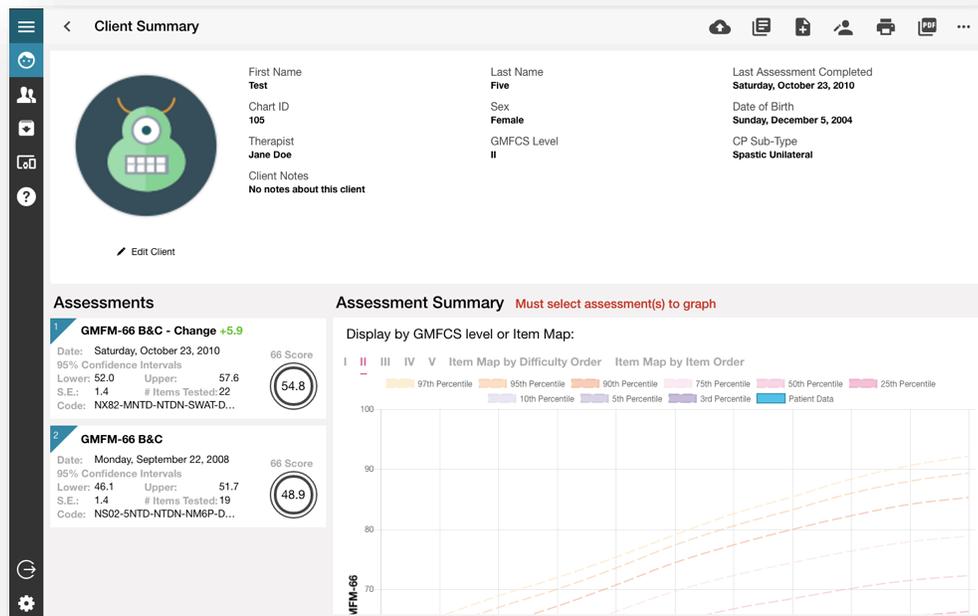


Figure 6: Client Summary (Computer Version)

## *Archiving Clients or Assessments*

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In order to remove a client from a Therapist's caseload or remove an assessment from a client's profile, you will need to Archive the data. Archiving will not delete the client or assessment completely, rather it will file them in the Archive Folder. NOTE: For those using a Multi-User account, archived assessments will only be visible to the Administrator.

To archive a **client**, click on client you wish to archive (must be highlighted blue) then click  from the client profile page or right click on the client's name you wish to archive and select archive client.

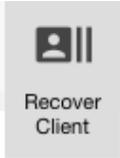
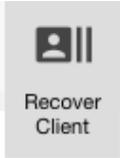
To archive an **assessment**, on the assessment summary page click on . You can also archive an assessment from the client profile page by right clicking on the assessment you wish to archive, then select archive assessment. The program will have an automatic pop up to confirm the move of the data into the archive folder. Once confirmed, the data will be removed from either the Therapist profile or Client profile.

## *Recovering Archived Clients or Assessments*

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### **Single User Version:**

To recover data that was moved to the archived folder, first click on  from the left hand side bar within the client profile page. To recover an entire client, click on the client you wish to recover from the

 left hand column, then click  (or right click on client's name and select Recover Client). The program will then prompt you with the following statement "Are you sure you want to recover this client, you will be set as the assigned Therapist?". Once confirmed by clicking the green checkmark in the pop-up box, the client will be moved to your client list.

To recover an assessment, from the archive page, click on the client you wish to recover the assessment from, then click on the assessment you wish to recover. The program will prompt you to confirm whether you want to recover this assessment. Once confirmed (by clicking the green checkmark on the pop-up window), the assessment will be moved back to the client profile. If the client profile does not exist (outside the archive folder), the client will be recreated with the assessment recovered.

Multi-User Version:

Archived assessments are only visible to the Administrator within the Multi-User version (this was done purposefully to ensure client confidentiality). If a therapist chooses to archive an assessment or a client, they will not be able to recover the data themselves and will need to request the Administrator's assistance in recovering data.

The above instructions can be used to recover data for both an assessment and a client. NOTE: If an entire client was archived, the data will be recovered to the Administrators account and they will then need to reassign the client to a therapist. If an assessment was archived and the client still exists under a therapist's profile (i.e., the ID exists under a therapist's profile), the assessment will be recovered wherever that Chart ID exists.

## *Syncing, Exporting or Transferring Data*

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### **Syncing Data – Configuring Server**

Data can only be synced between a Mobile or Single-User version and the Multi-User Version. Data is synced by Client ID. Therefore, you must ensure that the client exists on both systems in which you are trying to sync. In addition, both systems must be on the same local area network when syncing data.

In order to Sync devices, you must first configure the Mobile or Single-User version to the server (Multi-User version). To do this, you must know the Server Address, Server ID and Server PIN of the Multi-User

version. This information can be found by clicking on the devices icon  found on the left side bar on the Multi-User version. Note: if the Server Address runs over the Server PIN, go to full screen mode. Further, if you experience difficulties in syncing, check that the server information has remained the same. If trying to sync on a different network, you will need to reconfigure the connection (i.e., change the Server Address, Server ID and Server PIN).

When in the Single-User version, go to settings (which can be found by clicking on the  menu icon). Once in settings, click on Change Network Settings and reconfigure server. Enter the required server information and click on submit. Once prompted, you will then need to authentic the device on the Multi-User version. Go to the Devices icon on the Multi-User version and click on the green checkmark next to the device you would like to authenticate (left column - "Devices Awaiting Authentication"). Once authenticated the device will move to the right column "Authenticated Devices". The Multi-user version will take the IP address and device name from the device being synced.

On a Mobile device and from the client profile page, click on the three dots in the top right corner and then click on sync assessment. Choose all assessments you wish to sync to the Multi-User version and click on the checkmark in the top right corner of the pop-up window.



## Syncing Assessments

You will then need to accept the sync, by navigating to the clients' profile page on the Multi-User version and clicking on the sync assessment button. Assessments available to sync will appear in a pop up and you can select the ones you would like to accept.



## Transferring

Assessments can be transferred between any version of the GMFM App+ (Mobile, Single-User and Multi-User). To transfer an assessment in the Multi-User or Single User versions, you must first navigate to the client profile page in which you want to transfer the data to (when in the Multi-User or Single-User version have the specific client's name highlighted). NOTE: If you are not in the right client profile page, your assessment will be transferred to the wrong client. Click on the transfer data button and enter the Autocomplete Code (also known as the Assessment Code) in the version you wish to transfer the data to. Once a valid code has been entered, the system will automatically bring up the assessment and you then must accept it.



## Exporting data

Data can be exported from either the Multi-User version or the Single-User version (but not the Mobile version). Data is exported into a CSV file which can be opened by Excel and Numbers. To export data, go to the therapist page and click on the export clients button found on the top right bar. The program will then prompt you to save a file. Once saved, you can then navigate to the directory in which you saved the document and open the file. The following fields will be exported: Chart ID, Client Name, GMFCS Level, Classification Type, Assessment Type, all 88 items, GMFM 88 Score, GMFM 66 Score, Sex, Date of Birth, and Assessment Date. NOTE: For MAC users, you may need to save a CSV file via Numbers to allow upload into another GMFM App+ (as some features are removed in the saving process).



## Importing data

Data can also be imported from either previous versions of the GMAE program or another GMFM App+. To import data, go to the therapist page and click on the import clients button on the top right bar. Then choose "Open CSV file". You will then need to navigate on your computer to the location in which the CSV/Excel file is located. All clients within the file will show up in individual tiles. You must go through and check the generated list of clients, making edits where necessary. NOTE: If a client ID from the CSV file already exists in the GMFM App+, in the generated list the client will be set to update (rather than

new client). Data will be merged with the existing client ID in the GMFM App+ (this is a problem if they are not the same client). Please ensure that you have a unique ID for each client. Once you have made any updates necessary, click on “Confirm Imported Clients” to have them integrated into the app.

Please note, the GMAE-2 program does not export the following fields: Sex, or Therapist. When importing data, you will need to manually complete these fields before confirming imported clients. Further, when importing, assessment date will be automatically set to the date of import. You will need to correct this by editing each assessment (see edit assessment section above).

Also note, when importing the GMAE or GMAE-2 data, data will automatically be run through the GMAE-3 algorithm thereby modifying the scores based on the more precise GMAE-3 algorithm.