

# How to Automate AHRQ Quality Indicators (QI) SAS Software Runs in Windows, v2022

**Prepared for:** 

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#### **Overview**

This document demonstrates how to schedule automated Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI) SAS® Software runs on a Windows® computer. The examples contained in this document use the Patient Safety Indicators (PSI) module; however, these instructions can be applied to any module or combinations of multiple modules. Automating SAS runs in Windows is a straightforward process that allows users convenience and flexibility.

There are two options for automating software runs: (1) a five-step process to schedule a single SAS run via the Windows Task Scheduler, and (2) a five-step process to schedule a multiple sequential SAS runs using a batch process. This document contains basic written instructions followed by a screen shot for each approach. Note, steps 1 and 2 are identical for both options.

## Option 1: Scheduling Automated Runs using the Task Scheduler

The five steps for manually scheduling automation for a single module at a time are described below:

- 1. Create a new task in the Task Scheduler
- 2. Choose the time and date the new task will run
- 3. Specify the exact Windows path to run SAS
- 4. Include additional Windows command parameters for saving SAS logs and output
- 5. Test Task Scheduler

#### 1. Create a New Task in the Task Scheduler

Windows Task Scheduler is a utility that comes with Windows 10 and is integral for automating processes. Open the Task Scheduler by selecting the Windows icon in the lower left corner of the screen, typing "Task Scheduler", and selecting the Task Scheduler App in the search results (Figure 1).

# All App Documents Web More Image: Constraint of the second se

Figure 1. Windows Task Scheduler

Once the Task Scheduler is open, select "Action" from the top menu and then select "Create Task..." from the drop-down options. This will open the "Create Task" window (Figure 2).

Figure 2. Create Task Window

k Schedu	ler	
Action	View	Help
Co	nnect to	Another Computer
Cre	eate Basio	c Task
Cre	eate Task.	
Im	port Task	
Dis	play All I	Running Tasks
En	able All T	asks History
AT	Service A	account Configuration
Re	fresh	
He	lp	
	Action Co Cre Im Dis Ena AT Ref	Action View Connect to Create Basic Create Task Import Task Display All I Enable All T AT Service A Refresh Help

From the Create Task window, select the "General" tab and provide a task name and description in the **Name** and **Description** fields (Figure 3). In this example, to automate the PSI software run, the task is named "Run PSI v2022" and the description is "Run the PSI Control Program v2022 every Friday at 12:15 PM". This tab also provides the option to run the task when not logged on to a user account, as well as with the highest permissions. Do not click "OK" at this step. Instead, stay in the "Create Task" window to continue to Step 2.

🕒 Create Task			×						
General Trigg	ers Actions Co	nditions Settings							
Name:	psi v2022								
Location:	<b>\</b>								
Author:	Author:								
Description:	Run psi v2022								
Security opti When runni	ons ng the task, use th	e following user account:							
		,	Change User or Group						
Run only	when user is logg	ed on							
O Run whe	ther user is logged	on or not							
Do n	ot store password.	The task will only have access to local comp	uter resources.						
🗌 Run with	highest privileges								
Hidden	Configure fo	Windows 10	×						
			OK Cancel						

Figure 3. General Tab in the Create Task Window

#### 2. Choose the time and date the new task will run

Select the "Triggers" tab. The "Triggers" tab collects the time and day the process will run, as well as the recurrence schedule. To run the task on a schedule, choose "On a Schedule" from the Begin the Task drop-down menu (Figure 4). Other options can be selected for scheduling from this drop-down.

In this example, the PSI software is now scheduled to run every Friday at 12:15 PM. Click "OK" to exit the "Triggers" tab and go back to the "Create Task" main menu.

New Trigger							×
Begin the task: Settings	On a schedule				v		
<ul> <li>One time</li> <li>Daily</li> <li>Weekly</li> <li>Monthly</li> </ul>	Start: 5/ Recur ev Sunda	l4/2021 ery: 1 ny □ Mo day ☑ Fri	• 12:15 weeks or onday [ day [	n: ] Tuesc ] Satur	ay 🗋 Wednesda	ize across time	zones
Advanced settir	igs						
Delay task f	or up to (randor	n delay):	1 hour				
Repeat task	every: 1 hour all running tasks	at end of re	petition	duration	for a duration of:	l day	
Stop task if	it runs longer th	an:	s days				
Expire: 5	/14/2022 💷-	12:00:35 PN	1		Synchronize ac	ross time zone	5
Enabled							
						ОК	Cancel

Figure 4. Triggers Tab in the Create Task Window

#### 3. Specify the exact Windows path to run SAS

Once back at the "Create Task" main menu, select the "Actions" tab. Select the New... button (Figure 5).

Figure 5. Actions Tab in the Create Task Window

Seneral Tri	ggers Actions	Conditions	Settings		
When you	i create a task, y	ou must speci	y the action that will occur when your	task starts.	
Action	De	tails			5
New	Edit	Dele	e		
					-

This will bring up the "New Action" dialog box. This box will specify how to run SAS, what program to run, and what output options to choose.

First, select **Start a Program** from the drop-down menu. Next, in the Program/Script box, navigate to where the SAS.exe file can be found on your computer (<u>Figure 6</u>). An example location would be: C:\Program Files\SASHome\SASFoundation\9.4\SAS.exe.

tion:	Start a program				
etting	5				
Progra	m/script:				
C:\Pro	gram Files\SASHo	me\SASFounda	ation\9.4\SAS	.exe	B <u>r</u> owse
<u>A</u> dd a	guments (option	al):			
S <u>t</u> art i	n (optional):				

#### Figure 6. Specifying the Program in the New Action Dialog Box

### 4. Include additional Windows command parameters for saving SAS logs and output

Next, additional arguments need to be specified. These arguments indicate which program to run in SAS, as well as what output files to create. In the "Add arguments" box:

- 1. Specify in quotes the full path of the QI control program to run.
- 2. To create a log, add the -log option to the text above in Step 4.1 and specify the full path in quotes to a log file to be created.
- 3. To create a listing file, add the -print option to the text above in Step 4.1 and specify the full path in quotes of the listing file to be created.
- 4. Select "OK".

The example below demonstrates the text arguments needed to run the PSI\_HOSP\_CONTROL.sas program and create a log and listing file (Figure 7).

"C:\Users\yourusename\Desktop\QI\PSI\Programs\PSI\_HOSP\_CONTROL.sas" -log "C:\Users\ yourusename\Desktop\QI\PSI\Programs\PSI\_HOSP\_CONTROL.log" -print "C:\Users\ yourusename\Desktop\QI \PSI\Programs\PSI\_HOSP\_CONTROL.lst"

New Actio	n			$\times$
You mus	t specify what action this task will perform.			
Action:	Start a program		~	
Settings	5			
<u>P</u> rogra	ım/script:			
C:\Prog	gram Files\SASHome\SASFoundation\9.4\SAS	.exe	B <u>r</u> owse	
<u>A</u> dd ai	guments (optional):	s\PSI_H	OSP_CONTROLIst	
S <u>t</u> art ir	n (optional):			
		-		
		OK	Cancel	
Progra C:\Prog Add au S <u>t</u> art ir	im/script: gram Files\SASHome\SASFoundation\9.4\SAS guments (optional): h (optional):	.exe s\PSI_H	Browse OSP_CONTROLIst	

Figure 7. Adding Arguments in the New Action Dialog Box

Now that the task is set up, select "OK" again from the "Create Task" window and the task will be ready to run as scheduled on Fridays at 12:15 PM.

#### 5. Test Task Scheduler

Test the task scheduling by double clicking the scheduled "Run PSI v2022" task from the "Active Tasks" menu in Task Scheduler and selecting "Run" from the "Action" menu on the right side of the window. This will immediately run the specified program in the "Add arguments" dialog box and will create log and list files, if specified. Check the location to verify that a log file was created. If the log file is not present in location specified in the "Add arguments" box, ensure the specified paths have quotations and otherwise reflect the intended location.

#### **Option 2: Scheduling Automated Runs using a Batch Option**

Batch files are executable text files that list out multiple commands and parameters, and can be used to run multiple programs in sequence. When running the SAS QI software, a batch file can be used to run the programs from multiple modules in sequence. This option requires four steps; the first two steps are identical to those needed to manually schedule an automated run. The instructions are repeated below for ease of use. To use the batch scheduling option, the five steps include:

- 1. Create a new task in the Task Scheduler
- 2. Choose the time and date the new task will run
- 3. Create a batch file
- 4. Specify the exact batch file Windows path to run SAS
- 5. Test Task Scheduler

#### 1. Create a New Task in the Task Scheduler

Windows Task Scheduler is a utility that comes with Windows 10 and is integral for automating processes. Open the Task Scheduler by selecting the Windows icon in the lower left corner of the screen, typing "Task Scheduler", and selecting the Task Scheduler App in the search results (Figure 8).

All	Apps	Documents	Web	More 👻	R
Best m	atch				
۲	Task Sch App	heduler			(-)
Search	work and	lweb			Task Scheduler
,⊂ ta	isk sch - S	See work and we	b results	>	App
					□       Open         □       Run as administrator         □       Open file location         □       Pin to Start         □       Pin to taskbar
,⊖ ta	isk sched	uler			

Figure 8. Windows Task Scheduler

Once the Task Scheduler is open, select "Action" from the top menu and then select "Create Task..." from the drop-down options. This will open the "Create Task" window (Figure 9).

#### Figure 9. Create Task Window

🕑 Tas	k Schedu	ler	
File	Action	View	Help
(= =	Co	nnect to	Another Computer
🕑 Ta	Cre	eate Basic	: Task
>	Cre	eate Task.	-
	Im	port Task	
	Di	splay All F	Running Tasks
	En	able All Ta	asks History
	AT	Service A	ccount Configuration
	Re	fresh	
	He	lp	

From the Create Task window, select the "General" tab and provide a task name and description in the **Name** and **Description** fields (Figure 10). In this example, to automate the PQI and PSI software runs, the task is named "Run PQI and PSI v2022" and the description is "Run the PQI and PSI Control Programs v2022 every Friday at 12:15 PM". This tab also provides the option to run the task when not logged on to a user account, as well as with the highest permissions. Do not click "OK" at this step. Instead, stay in the "Create Task" window to continue to Step 2.



🕒 Create Ta	ask												$\times$
General T	riggers	Actions	Conditi	ons	Settings								
Name:	Run	PQI and I	PSI v2022	2									
Location:	X												
Author:													
Descriptio	in: Rur	n the PQI a	and PSI (	Contro	ol Program	s v2022 Ev	ery Friday	y at 12:1	5 PM				
Security	options												
When ru	unning th	ne task, us	se the fol	lowin	ng user acc	ount:							
									[	Change l	Jser or	Group	
Run c	only whe	n user is l	logged o	n									
O Run v	whether	user is log	ged on	or no	t								
	o not sta	ore passw	ord. The	task	will only h	ave access	to local	comput	ter res	ources.			
Run v	with high	nest privile	eges										
🗌 Hidder	n	Configu	ire for:	Wind	dows 10								~
										ОК		Cance	ł

#### 2. Choose the time and date the new task will run

Select the "Triggers" tab. The "Triggers" tab collects the time and day the process will run, as well as the recurrence schedule. To run the task on a schedule, choose "On a Schedule" from the Begin the Task drop-down menu (Figure 11). Other options can be selected for scheduling from this drop-down.

In this example, the PQI and PSI software are scheduled to run every Friday at 12:15 PM. Click "OK" to exit the "Triggers" tab and go back to the "Create Task" main menu.

New Trigger						×
Begin the task: Settings	On a schedule					
<ul> <li>One time</li> <li>Daily</li> <li>Weekly</li> <li>Monthly</li> </ul>	Start: 5/ Recur ev Sunda	I4/2021 ery: 1 w by ☐ Mon day ☑ Frida	12:15 PM reeks on: iday Tur iy Saf	1 : Synchro esday 🗌 Wedneso urday	onize across time : lay	zones
Advanced settin	igs					
🗌 Delay task f	for up to (randor	n delay): 1 }	our	-		
Repeat task	every: 1 hour	e - 14		for a duration of:	1 day	
Stop	all running tasks	at end of repr	etition durati	on		
Stop task if	it runs longer th	ian: 3 d	days			
Expire: 5/	/14/2022 🛛 🖓 -	12:00:35 PM	:	Synchronize	across time zones	6
Enabled						
					ОК С	Cancel

#### Figure 11. Triggers Tab in the Create Task Window

#### 3. Create the batch file

Batch files end in the .BAT suffix. Create a batch file in an editor and then add commands. The first command should invoke SAS, the second command should specify what program to run in SAS, and finally any additional commands should indicate any output files.

An example of a batch file that runs PQI and PSI in sequence includes these two sequences of commands in a file called "Run PQI PSI.bat." The paths need to be valid paths in your environment:

"C:\Program Files\SASHome\ SASFoundation\9.4\sas.exe." "C:\Users\ YourUserName\Desktop\QI \PQI\Programs\PQI\_AREA\_CONTROL.sas" -log "C:\Users\ YourUserName\Desktop\QI\PQI\Programs\PQI\_AREA\_CONTROL.log"

"C:\Program Files\SASHome\ SASFoundation\9.4\sas.exe." "C:\Users\ YourUserName\Desktop\QI\ PSI\Programs\PSI\_HOSP\_CONTROL.sas" -log "C:\Users\ YourUserName\Desktop\QI\PSI\Programs\ PSI\_HOSP\_CONTROL.log"

#### 4. Specify the exact batch file Windows path to run SAS

Once back at the "Create Task" main menu, select the "Actions" tab. Select the New... button (Figure 12).

Create	Task									$\times$
General	Triggers	Actions	Conditions	Settings						
When	you create	e a task, yo	ou must speci	fy the actio	on that will	occur whe	n your task s	tarts.		
Action	1	De	tails						6	
Ne	w	Edit	Dele	te						
								ОК	Cance	4

Figure 12. Actions Tab in the Create Task Window

This will bring up the "New Action" dialog box (Figure 13). This box will specify the batch file to call. Batch files end in the .BAT suffix. This technique runs the batch file like an executable file.

The example below demonstrates how "Run\_PQI\_PSI.bat" would be called in Task Scheduler.

Figure 13. Specifying the Batch File in the Task Scheduler

	t specify what action this task will perform.	
(ct <u>i</u> on:	Start a program	~
Setting	5	
<u>P</u> rogra	m/script:	
C:\Use	rs\YourUserName\Desktop\Run_PQI_PSI.bat	Browse
<u>A</u> dd a	guments (optional):	
S <u>t</u> art ir	(optional):	

#### 5. Test Task Scheduler

Test the task scheduling by double clicking the scheduled "Run PSI v2022" task from the "Active Tasks" menu in Task Scheduler and selecting "Run" from the "Action" menu on the right side of the window. This will immediately run the specified program in the "Add arguments" dialog box and will create log and list files, if specified. Check the location to verify that a log file was created. If the log file is not present in location specified in the "Add arguments" box, ensure the specified paths have quotations and otherwise reflect the intended location.

#### **Summary and More Information**

This concludes how to set up the QI software to run automatically using the Task Scheduler in a Windows environment. Users can create more than one task to schedule a single module to run at different points in time using Option 1. Alternatively, users can create batch files to schedule multiple modules to run in sequence using Option 2.

For more information on Windows Task Scheduler, please see this link: <u>https://docs.microsoft.com/en-us/windows/win32/taskschd/about-the-task-scheduler</u>

For more information on SAS Batch Commands in Windows see this link:

https://www.pharmasug.org/proceedings/2013/CC/PharmaSUG-2013-CC18.pdf