1) How to set up Med Sim Studio



When you click "Launch" the software opens two windows, the Control and the Display. Your learners should only view the Display window – you will decide what is and is shown with the Control. You can use a two-monitor system for in-person teaching, or use window share for remote learning with programs such as Zoom/WebEx/Google Meet/Skype/Etc.



Setting up a two-monitor system:

- 1) Plug a second monitor (or projector) into your computer.
 - a. Press "Win + P" and click Extend

or

- b. Right-click on your desktop and click "Display Settings."
- c. Under "Multiple displays," click **Extend these displays**.
- 2) Drag the **Display** window to the second monitor and MAXIMIZE it.





Setting up for remote learning:

- 1) Open the remote learning software.
- 2) Invite your learners to the same online meeting.
- 3) Use the "Screen Share" option and share the **Diplay** window.





2) How to use Med Sim Studio

You may use this software as a vital sign monitor, medical image library, scribe, and evaluation tool. You may run through pre-scripted cases, or author and share your own simulation cases.

You can use Med Sim Studio for In-Situ simulation in the clinical environment, simulation laboratory education, small group tabletop simulation, or remote learning. Select the corresponding tabs to view examples.

If you are using Med Sim Studio for the first time, try it on "**Keep It Simple**" mode and work your way up until you are comfortable with the different features.

When you are ready to try out a pre-scripted case, select the "**Case Runner**" tab then run the "**Med Sim Studio introduction case**" first. It will give you an interactive demonstration.

Let's get started:



Keep It Simple

- Click "Keep It Simple" then "Launch!"
- Make sure you can face the gray **Control** window and your learners are facing the black **Display** window.

- Adjust the preset vital sign patterns. The vital signs and rhythm will be displayed for your learners.

Monitor Only

- Click "Monitor Only" then "Launch!"
- Click either the upper left "All" checkbox on the Monitor Control, or the "M" button on the display preview to turn on the monitor. Alternatively, you can click individual vital sign checkboxes (e.g., Heart Rate, Rhythm, etc.) to only display individual vital signs.
- Toggle "Auto Apply" to determine whether vital sign changes should be immediate, or only after clicking the corresponding "Go" button. If "Auto Apply" is not checked, the vital sign will not change for your learner until after you have clicked "Go."
- Change the vital signs by typing them into the left-most box, or by moving the slider, or by clicking the numbers beneath the slider. The vital sign will change on the **Monitor** window facing your learners, and simultaneously on **Display Preview** that faces you.
- You can change the Rhythm through the dropdown menu.
- If you would like the vital sign to change over time (for example, go to heart rate of 40 beats per minute over 15 seconds), input the time interval into "Δ Interval" for all vital signs, or into the box adjacent to "Go" for an individual vital sign.

Streamlined

- Click "Streamlined" then "Launch!"
- Click on the "Stimuli" tab to access an abbreviated stimulus library.
- Click on different stimulus buttons. These will be displayed on the **Monitor** window for your learners.
- Select different options from the "Display Style" box. You can keep a text or image stimulus maximized indefinitely. By default, after a short duration the view will return to "Tri-View" to display the monitor and stimuli. If you would like to change the duration, go to "Settings."
- To clear a stimulus from view click on the corresponding "X" or "Clr" button.
- The "Favorites" can be changed from "Settings" as well.

Complete

- Click "Complete" then "Launch!"
- Click on the "Stimuli" tab, then on the various stimuli category tabs. You
 may display an image or text stimulus either by clicking the corresponding
 button, or by selecting it from a dropdown list and clicking the "Go" button.
- You may use a custom stimulus by selecting the "Custom" tab, then either type text into the white text box or click the black image box to load an image. Once the stimulus is read, click the corresponding "Go" button.
- You may record actions via the "Scribe" tab. Either click the corresponding action button (e.g., "Oxi-Mask" or "Tourniquet") or enter a custom scribe line and click the "Log" button. These will be timestamped and added to the "Action Log" in the lower right area of the screen.
- Select the "Assessment" tab and fill out the fields for the assessment tool. The assessment tool and action log will be saved into the Med Sim Studio directory. Alternatively, you may access the assessment tool and action log output by selecting the "Output" tab and copy & pasting the text into a word processor.

<u>Settings</u>

- Splash Screen sets a default display image. This can be a QR code that leads to a survey, your institution's logo, pre-brief instructions, etc. The Splash Screen can be activated by clicking the Med Sim Studio icon adjacent to the timer on the monitor controller.
- **Favorites** adds specific stimuli to the "**common**" tab in Complete and Streamlined modes.
- Accessibility allows for changing the font size on text blocks in a case.

3) How to run pre-scripted cases

Med Sim Studio allows you to run pre-scripted cases that contain all the computer resources you need to teach with medical simulation. Cases provide all the <u>labs</u>, <u>ECGs</u>, <u>radiographs</u>, and <u>vital sign pattern changes</u> with a single click. They also contain the <u>medical background information</u> and <u>debrief plan</u> to make sure your simulation session is a success!

Opening a case:

On the main page select the **"Case Runner"** tab, then select the case you want to run, then **"Launch."**

🚺 Launcher	– 🗆 X			
Launcher Case Runner Data Analysis Instructions	s About Settings			
1) Select a Case				
Favorites All Online My Cases	Case Summary			
 Med Sim Studio introduction case Anaphylaxis Gunshot wound to head Septic Shock Secondary to Pneumonia Diabetic ketoacidosis Angioedema 	Title: Med Sim Studio introduction case Author: Adam Blumenberg MD MA Date written: 12/02/2021 Summary: This is an interactive case that lets you try out the features of Med Sim Studio's cases!			
↑ Create Load cases				
 ^{2 Select Layout:} Complete O Streamlined O Monitor Only O Keep It Simple Launch! 				

Once you click "Launch," the operator screen will be available.

Running a case:

Cases open onto the **Control** window. Here, you will have access to **Action Buttons (1 & 2)**, **Stimuli (3)**, and **additional information about the case (4)**.

<u>Clicking</u> an **(1, 2)** Action button will log the action, and carry out pre-scripted vital sign changes. For example, clicking "Resp worse" may lower the oxygen saturation, increase the end-tidal CO2, and increase the respiratory rate while clicking "Resp Better" may improve those vital signs. <u>Hovering</u> your mouse over an action button will give you a **preview**.

<u>Clicking</u> a **(2) Critical Action** button will perform the action, strike it out and log it. All **Critical Actions** are logged at the end of the case.

<u>Clicking</u> a **(3) Stimulus** button such as "ECG" will display the case-specific stimulus to your learners. <u>Hovering</u> your mouse over it will give you a **preview**.

<u>Selecting</u> an **(4) Information Tab** will give you additional information about the case. You can use this before running the case to familiarize yourself with the **Background Medicine**, **Play-of-Case**, **History**, **Physical Exam**, and **Debrief Plan**.

Med Sim Studio: Operator Interface			
Case Monitor Control Stimuli			- Display Preview
Control Background Pla	Control Background Play-of-Case Buttons History Physical Debrief		
Triage Note/EMS Repor brought him over from tri started having lip swellin signs for him, I was cond	t: Nurse: "Hi doc, this is N iage - he was upstairs for g about twenty minutes a cerned and brought him s	Ir. Smith. We just a clinic appointment and go". I do not have vital traight back.	101 98.6 etco2 98% 48 98% 21 BP mmHg 160 / 90 M
Resp wors	se Re	sp Better	
Resp Cras	sh Vit	alsNormal	
Critical Actions	2		Clr
Oxygen Given	Prep-Intubat	CallENT/Anes	
	Call RT	Cric	Timer 00 : 00 : 04 III
	Call ICU		Scale + - 80 % O Text Full Screen
Stimuli			Action Log »
Angioedema	CXR-No Tube	CXR-ET Tube	Time 00 : 00 : 00 HR: 101 bpm, BP: 160/90 mmHg, RR: 21 bpm, sp02: 98%.
VBG	CBC _BMP	ECG	etCO2: 48, Temperature: 98.6 F, Rhythm: Sinus Rhythm.
	US-LungSlide	FAST (Neg)	Time 00 : 00 : 00 Case begins.

Getting new cases:

Med Sim Studio allows users to author and share cases. You can add new cases by **downloading** them from the **online tab**, or by clicking "**Load cases**" and manually adding a "**.mssBundle**" file.



Downloadable cases may be **Reviewed**, where I (Adam Blumenberg MD) reviewed and edited the case. **Unreviewed** cases are uploaded by other users and may or may not be high quality. Click the "**Search**" tab if you're looking for something specific.

If you prefer to use Med Sim Studio offline you can share cases with colleagues via email, USB drive, CD/DVD, etc. as **".mssBundle**" files. Your cases are saved in "C:\Users\[YOURCOMPUTER]\Documents\MedSimStudio\MyCases"

4) How to author and share cases

An important benefit of using Med Sim Studio is that you can author and share your own customized cases. Case authoring lets you put everything you need in one place – medical images, lab values, ECGs, pre-scripted changes in vital signs, background information, a debrief plan, etc. Cases are made up of three elements:

Background information boxes: These contain all the information an educator needs to prepare for and run a sim case. For example, the **Debrief** tab contains the learning points, topics, and structure to debrief the case.

Action buttons: These are pre-scripted vital sign changes and scribe entries. For example, a single button click simultaneously decreases SPO2 by 5% over 5 seconds and increases heart rate by 10 bmp over 15 seconds.

Stimulus buttons: These are pre-selected words or images. For example, a single button click displays a complete blood count and metabolic panel, or an ECG showing an inferior STEMI.

You can save and use cases that are works in progress (pieces are missing or incomplete) but only completed cases can be **uploaded** and shared with other users.

Creating a case:

In the **Case Runner** tab click the **Create** button. You can either use a **template** or create your case from scratch. Templates include some structure and pre-scripted actions. I recommend using templates (at least at first).

Filling out background information boxes:

 Fill out the Case title, Brief case summary, and Author's name. Optionally, you can include your email address and a website related to the case. The website can be a survey so that you can collect reviews from people who use your case.

- 2) Fill out the **initial vital signs**; these are the first vitals that show up in the case.
- 3) Fill out information about the intended **learners** (e.g., junior and senior residents), and **topics** (e.g., Emergency Medicine and Trauma).
- 4) Fill out the case prompt that starts the case, e.g., "A 35 year old woman develops shortness of breath after being stung by a bee."

case title Control Backtround Creator Stimulus Creator G.g., "Anaghynois" Control Backtround Creator Stimulus Creator Fig., "A case of anaphylaxis. The learners must identify anaphylaxis, assess the airway, and provide epinephrine. E.g., "A assee of anaphylaxis. The learners must identify anaphylaxis, assess the airway, and provide epinephrine. E.g., "A assee of anaphylaxis. The learners must identify anaphylaxis, assess the airway, and provide epinephrine. E.g., "Loalle the Cat MD" E.g., "Loalle the Cat MD" Author Name E.g., "Loalle the Cat MD" [] [] Gase title E.g., "Loalle the Cat MD" [] [] Muthor's email (Optional) [] [] [] E.g., "Loalle Ghiding UnderTheSofa.com" [] [] [] Case title [] [] [] [] Initial Vitals [] [] [] [] [] Initial Vitals [] [-	Git Action Creator Stimulius Creator proxis* ummary a of anaphylaxis. The learners must identify anaphylaxis, invay, and provide epinephrine. e the Cat MD" ai (Optional) @HidingUnderTheSofa.com* ib cat At 2010 ai (Optional) @HidingUnderTheSofa.com* ib cod Pressure sp02 ib cod Pressure sp03		- Oporator's view	_
Case title E.g., "Anaptytaxis," Bitefades summary E.g., "A 35 year old woman develops shortness of breath being stung by a bee," E.g., "A anaptytaxis, The learners must identify anaptytaxis, assess the airway, and provide epinephrine. E.g., "A 35 year old woman develops shortness of breath being stung by a bee," Author Name E.g., "Loolle the Cat M0" E.g., "A 15 year old woman develops shortness of breath being stung by a bee," Cease to anaphytaxis, The learners must identify anaptytaxis, assess the airway, and provide epinephrine. E.g., "A 15 year old woman develops shortness of breath being stung by a bee," Cell 1 Cell 2 Cell 3 Cell 4 Describe scenario e.g., "Patient arrival" [] [] Author Semail (Optional) [] [] [] E.g., "Nume State for data collection or reading (Optional) [] [] [] E.g., "Nume State and the scenario e.g., "Patient arrival" [] [] [] Initial Vitals [] [] [] [] [] Heart B 1:s Blood Pressure go 7 [] [] [] [] Learners Sumu State asstartis = in Nursed = SM5 Blood 7 [] [glass: unmary	ase Information Action Creator Stimulus Creator	Control Deckensund Dime CO	Mistan, Divisional Dataire
E.g., "Anartynais" Brief ase summary Fig., "A case of anaphylaxis. The learners must identify anaphylaxis, assess the airway, and provide epinephrine. Author Name E.g., "Lucille the Cat MD" Author's email (Optional) E.g., "Lucille QHidingUnderTheSofa.com" Case w bysite for data collection or reading (Optional) E.g., "www.sonewAboutThisCaseThatGivesYouData cort Initial Vitals Hear D to Rythm Sinus Rhythm Junior Receives Junior Receives Displatan Assistants Nurses Devision Carciology - Pulmonary Cell Renal Devision Origonal E.g., "As grear old woman develops shortness of breath being stung by a bee." Cell 1 Cell 2 Cell 3 Cell 4 Cell 1 Cell 2 Cell 3 Cell 4 Cell 1 Cell 2 Cell 3 Cell 4 Cortical Actions Circle Actions Circle Actions Circle 1 Cell 2 Cell 3 Cell 4 Circle 2 Cell 4 Circle 3 Cell 4 Circle 4 Circle 4 Circle 4 Circle 4	gatis*	Case title	Control Backaround	Physical Debrie
Briet/ase summary Fg., "A case of anaphylaxis. The learners must identify anaphylaxis assess the airway, and provide epinephrine. Author Name Eg., "Lucille the Cat MD" Author's email (Optional) E.g., "Lucille@HidingUnderTheSofa.com" Case whysite for data collection or reading (Optional) E.g., "www.s.newAboutThisCaseThatGivesYouData.cov" Initial Vitals Hear 12 the 13 the 14 the 14 the 15 the 16 the 16 the 16 the 17 the <	ummary e of anaptifytaxis. The learners must identify anaphytaxis, airway, and provide epinephrine. e the Cat MD" ai (Optional) @HidingUnderTheSofa.com" e for data collection or reading (Optional) arewAboutThisCaseThatGivesYouData cord Blood Pressure \$p02 120 / 80 99 18 / 102 100 101 101 102 103 104 104 105 105 106 107 108 108 109 109 100 101 102 103 104 105 106 107 108 108 109 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 102 103 104 104 105 105 106 107 108 108 109 101 101 101 101 102 <tr< td=""><td>E.g., "Ananh Jiaxis"</td><td>E.g., "A 35 year old woman develo</td><td>ps shortness of breath after</td></tr<>	E.g., "Ananh Jiaxis"	E.g., "A 35 year old woman develo	ps shortness of breath after
Fy3, "A case of anaphylaxis. The learners must identify anaphylaxis, lissess the airway, and provide epinephrine. Author Name E.g., "Lucille the Cat MD" Author's email (Optional) E.g., "Lucille (Philding/UnderTheSofa.com" Case whysite for data collection or reading (Optional) E.g., "www.sonev/AboutThisCaseThatGivesYouData.com" Case whysite for data collection or reading (Optional) E.g., "www.sonev/AboutThisCaseThatGivesYouData.com" Nume Initial Vitals Heard Di to Blood Pressure \$\$902 Blood Pressure \$\$902 Isinus Rhythm \$\$97 Learners \$\$100 0 / 80 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	a of anaphylaxis. The learners must identify anaphylaxis, ainway, and provide epinephrine. e the Cat MD" ail (Optional) @HidingUnderTheSofa.com" e for data collection or reading (Optional) brevyAboutThisCaseThatGivesYouData.com Blood Pressure \$PO2 Resp. 1002 120 0 / 80 99 0 18 0 40 0 120 0 / 80 99 0 18 0 40 0 120 0 / 80 99 0 18 0 40 0 120 0 / 80 99 0 18 0 40 0 120 0 / 80 99 0 18 0 40 0 120 0 / 80 99 0 18 0 40 0 120 0 / 80 0 99 0 18 0 40 0 120 0 / 80 0 99 0 18 0 40 0 Save Case	Brief case summary	being stung by a bee.	
assess the airway, and provide epinephrine. Author Name E.g., Tucille the Cat MD" Author's email (Optional) E.g., "Lucille QHidingUnderTheSofa.com" Case wabsite for data collection or reading (Optional) E.g., "www.cnev/AboutThisCaseThatGivesYouData.com" Initial Vitals Heart Drio Blood Pressure Sp02 Rbythm Userners Junior Recibents Durystician Assistants Nurses Emers Durystician Emergency Medicine Topics Pediatios Pediatios Cardiology Publician C Nurses Continue Continue Continue Continue Continue Continue Save Case	ainway, and provide epinepinne. e the Cat MD" ail (Optional) @HdingUnderTheSofa.com" e for data collection or reading (Optional) hereyAboutThisCaseThatGivesYouData.con Blood Pressure \$90\$ 120 / 80 \$90\$ 120 / 98.7 • pictures 0 Senior Residents 0 Medical Students 0 Attendings Assistants 0 Nurses 0 Emergency Medicine 1 Toxicology 0 Shock 1 Trauma 1 Heme/Onc 1 Nursels 0 Medical Students 0 Infectious Discuse	F.g., "A case of anaphylaxis. The learners must identify anaphylaxis,		
Author Name g. "Lucille the Cat MD" Author's email (Optional) E. "Lucille@HidingUnderTheSofa.com" Case whysite for data collection or reading (Optional) E.g., "www.ScrewAboutThisCaseThatGivesYouData cert Initial Vitals Heart Driv Blood Pressure spQ2 Rhythm Temperature Sinus Rhythm 88.7 Learners Serior Residents Junior Ree! Juniss I Senior Residents Medical Students Attendings Topics Fewry Medicine Pediatrics Emergency Medicine Positions Save Case	e the Cat MD" all (Optional) @HidingUnderTheSofa.com" e for data collection or reading (Optional) herevAboutThisCaseThatGivesYouData.com 120 * / 80 * 99 * 18 * 40 * ythm 98.7 * ridons _ Senior Residents _ Medical Students _ Attendings Assistants _ Nurses _ EMS _ Emergency Medicine _ Toxicology _ Shock _ Trauma _ GU / Pulmonary! G Renal _ ENT _ OB/GYN _ Environmental - Heme/Onc _ Neurology _ Skin _ Ortho _ Psych _ Infectious Discusse	assess the airway, and provide epinephrine.	Cell 1 Cell 2 Cell 3 Cell 4	
Author Name E.g., "Lucille the Cat MD" Author's email (Optional) E. "Lucille@HidingUnderTheSofa.com" Case ubsiste for data collection or reading (Optional) E.g., "www.sureyAboutThisCaseThatGivesYouData.co.r Initial Vitals Heart Driv Blood Pressure J20 / 80 99 18 40 - Khythm Temperature 98.7 - Junior Recif units Senior Residents Junior Recif units Senior Residents Pediatrics EMS Topics Podiatrics Pediatrics Emergency Medicine Pediatrics Emergency Medicine Pediatrics Emergency Medicine Cardiology Pulmonary Gli Renal ENT Del vorine Heanel Onto Pediatrics Emergency Medicine Cardiology Pulmonary Gli Renal ENT OB/C Nurseis Cardiology Pulmonary Cardiology Pulmonary Cardiology Nursei	e		Describe scenario e.g., "Patient a	rrival"
E.g., "Lucille the Cat MD" Author's email (Optional) E. n. "Lucille@HidingUnderTheSofa.com" Case w. bisite for data collection or reading (Optional) E.g., "www.supeyAboutThisCaseThatGivesYouData.com" Initial Vitals Hearl P to 22 120 120 / 99 18 40 1 72 120 120 / 99 18 40 1 101 1 11 1 120 / 99 18 40 1 120 / 99 18 40 1 11 1 11 1 11 1 11 1 120 / 80 99 18 40 11 1 11 1 120 / 80 120 100 100 120 100 100 <td>the Cat MD" ail (Optional) @HidingUnderTheSofa.com" e for data collection or reading (Optional) begy AboutThisCaseThatGivesYouData con Blood Pressure \$p02 Resp. 120 99 18 40 99 18 40 interpretature 98.7 98.7 98.7 * Whtm 98.7 98.7 98.7 98.7 99.8 99.9 10.0 10.0 11.0 12.0 <</td> <td>Author Name</td> <td>[]</td> <td>[]</td>	the Cat MD" ail (Optional) @HidingUnderTheSofa.com" e for data collection or reading (Optional) begy AboutThisCaseThatGivesYouData con Blood Pressure \$p02 Resp. 120 99 18 40 99 18 40 interpretature 98.7 98.7 98.7 * Whtm 98.7 98.7 98.7 98.7 99.8 99.9 10.0 10.0 11.0 12.0 <	Author Name	[]	[]
Author's email (Optional) E "Lucille@HidingUnderTheSofa.com" Case w bisite for data collection or reading (Optional) E.g., "www.s.vevexboutThisCaseThatGivesYouData.co." Initial Vitals Heart D' to Blood Pressure \$p02 Resp. 100 1 <td>ail (Optional) @HidingUnderTheSofa.com" te for data collection or reading (Optional) weyAboutThisCaseThatGivesYouData.co. Blood Pressure \$\$pO2 Resp. 1002 120 # / 80 # 99 # 18 # 40 # Temperature \$\$97. # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # 120 # / 98 / 98 / 98 # 120 # / 98 / 98 # 120 # / 98 / 98 / 98 # 120 # / 98 / 98 / 98 # 120 # / 98 / 98 / 98 / 98 / 98 / 98 / 98 /</td> <td>E.g., "Lucille the Cat MD"</td> <td></td> <td>r 1</td>	ail (Optional) @HidingUnderTheSofa.com" te for data collection or reading (Optional) weyAboutThisCaseThatGivesYouData.co. Blood Pressure \$\$pO2 Resp. 1002 120 # / 80 # 99 # 18 # 40 # Temperature \$\$97. # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # Temperature \$\$98.7 # 120 # / 80 # 99 # 18 # 40 # 120 # / 98 / 98 / 98 # 120 # / 98 / 98 # 120 # / 98 / 98 / 98 # 120 # / 98 / 98 / 98 # 120 # / 98 / 98 / 98 / 98 / 98 / 98 / 98 /	E.g., "Lucille the Cat MD"		r 1
En, "Lucille@HidingUnderTheSofa.com" Case w.bsite for data collection or reading (Optional) E.g., "www.s. nevAboutThisCaseThatGivesYouData con Initial Vitals Heard P to Blood Pressure 90 18 40 Rhythm Temperature 98.7 1010 Serifons Senior Residents Mutical Students Attendings 1010 Pressures 1011 Environmental 1011 Controllegeneous Medicine 1012 Prediatrics Periodiatrics Periodiatrics Pendiatrics Neurology Skin Orito	@HidingUnderTheSofa.com" te for data collection or reading (Optional) weevAboutThisCaseThatGivesYouData co.r Blood Pressure spO2 Resp. 100 to 1 120 to 1 80 to 1 98 to 1 98 to 1 120 to 1 80 to 1 120 to 1 10 to 1 120 to 1 98 to 1 120 to 1 10 to 1 120 to 1 98 to 1 120 to 1 10 to 1 120 to 1 <t< td=""><td>Author's email (Optional)</td><td>[]</td><td>[]</td></t<>	Author's email (Optional)	[]	[]
Case w bosite for data collection or reading (Optional) E.g., "www.co.greyAboutThisCaseThatGivesYouData condition Initial Vitals Heart P to 120 / 99 18 40 72 120 120 / 88.7 40 Sinus Rhythm 98.7 Junior Recidents Medical Students Junior Recidents Medical Students Physician Assistants Nurses Physician Assistants Nurses Pediatrics Emergency Medicine Pediatrics Emergency Medicine Cardiology Pulmonary Gardiology Skin Nurses Skin Oric Nurses Pediatrics Emergency Medicine Cardiology Pulmonary Skin Ortho Psycho Infectious Directes	te for data collection or reading (Optional) DerevAboutThisCaseThatGivesYouData connections Biood Pressure \$, "Lucille@HidingUnderTheSofa.com"	Critical Actions	
g, "www.scorevAboutThisCaseThatGivesYouData control nitial Vitals Heart P. to Blood Pressure sp02 Resp. 120 1	Biood Pressure spO2 120 / 80 99 18 40 ythm 98.7 120 / 120 / 98.7 120 / 120 / 120 / 120 / 98.7 120 / 120 / 120 / 120 / 98.7 120 / 120 / 120 / 120 / 98.7 120 / <	Case wobsite for data collection or reading (Optional)	[]] []
nitial Vitals Heart P to P2 Blood Pressure P9 P9 P9 P0	Biood Pressure spO2 Resp. 100 1 <td>E.g., "www.SupreyAboutThisCaseThatGivesYouData.com</td> <td>[]</td> <td>1 []</td>	E.g., "www.SupreyAboutThisCaseThatGivesYouData.com	[]	1 []
Initial Vitals Blood Pressure sp02 Resp. 1202 18 1002 72 120 18 40 100 100 100 100 Rhythm 98.7 100	Blood Pressure spO2 Resp. 100 100 110 <td>nitial Vitala</td> <td></td> <td>1 1</td>	nitial Vitala		1 1
Image: The open inclusion of the op	Iz0 / 80 99 I8 40 Image: Strength of the strengen of the strength of the strength of the strengen of	Heart Policy Blood Pressure SpQ2 Resp. 1902	[]] []
Rhythm Temperature 98.7 [] [] [] [] earners Junior Recitorins Senior Residents Medical Students Attendings []	Image: Second Residents Medical Students Attendings Assistants Nurses EMS Image: Emergency Medicine Toxicology Shock Image: Pulmonary GI Renal Environmental Image: Heme/Onc Neurology Skin Ortho Psych Image: Heme/Onc Neurology Skin Ortho Psych	$72 \rightarrow 120 \rightarrow / 80 \rightarrow 99 \rightarrow 18 \rightarrow 40 \rightarrow 120 \rightarrow 72 \rightarrow 120 \rightarrow 1$	Stimuli	
Ringuint I emperature Sinus Rhythm 98.7 earners Junior Recidents] Senior Residents] Medical Students] Attendings Dysician Assistants] Nurses] EMS Save Case Fopics Save Case Pediatrics] Emergency Medicine] Toxicology] Shock] Trauma] GU Save Case Cardiology] Pulmonary] GI] Renal] ENT] OB/GYN] Environmental Discuse L.w. forrine] Heme/Onc] Neurology] Skin] Ortho] Psych] Infectious Discuse	hythm 98.7 98.7 1 1		[] [] […]
earners Unior Recitoms L Senior Residents Medical Students Attendings Unior Recitoms L Senior Residents Medical Students Attendings Unior Recitoms L Senior Residents Medical Students Attendings Unior Recitoms E Medical Students Attendings Save Case Save Case Copics Cardiology Pulmonary GI Renal ENT OB/GYN Environmental Cardiology Pulmonary GI Renal Ortho Psych Infectious Discusse	instruction iso.9	Sinue Dhuthm	[]] []
earners Junior Reciforns Senior Residents Medical Students Attendings Prysician Assistants Nurses EMS Save Case Save Case Cordiology Pulmonary GI Renal ENT OB/GYN Environmental Cardiology Skin Ortho Psych Infectious Discusse	reidontsSenior ResidentsMedical StudentsAttendings AssistantsNursesEMS Emergency MedicineToxicologyShockTraumaGU /_ PulmonaryGIRenalENTOB/GYNEnvironmental Heme/OncNeurologySkinOrthoPsychInfectious Discusse		f and l	1 []
Junior Rectorins Senior Residents Medical Students Attendings Physician Assistants Nurses EMS Save Case Sopics Pediatrics Emergency Medicine Toxicology Shock Trauma GU Cardiology Pulmonary GI Renal ENT OB/GYN Environmental Exclorine Heme/Onc Neurology Skin Ortho Psych Infectious Discusse	Senior Residents Medical Students Attendings Assistants Nurses EMS Save Case Save Case Save Pairs GU Pulmonary GI Renal Heme/Onc Neurology Skin Ortho Psych Infectious Discuse	earners	[]	1 []
Fopics Pediatrics Emergency Medicine Toxicology Shock Trauma GU Cardiology Pulmonary GI Renal ENT OB/GYN Environmental Exchorine Heme/Onc Neurology Skin Ortho Psych Infectious Discusse	Emergency Medicine Toxicology Shock Trauma GU Pulmonary GI Renal ENT OB/GYN Environmental Heme/Onc Neurology Skin Ortho Psych Infectious Discuse] Junior Rections □ Senior Residents □ Medical Students □ Attendings ↓Pt. sician Assistants □ Nurses □ EMS		Sava Casa
Dices Pediatrics Emergency Medicine Toxicology Shock Trauma GU Cardiology Pulmonary GI Renal ENT OB/GYN Environmental R. tocrine Heme/Onc Neurology Skin Ortho Psych Infectious Dicease	Emergency Medicine Toxicology Shock Trauma GU Pulmonary GI Renal ENT OB/GYN Environmental Heme/Onc Neurology Skin Ortho Psych Infectious Discuse	Lonice	\mathbf{N}	Save Case
Cardiology Pulmonary GI Renal ENT OB/GYN Environmental	y _ Pulmonary_ GI _ Renal _ ENT _ OB/GYN _ Environmental Heme/Onc _ Neurology _ Skin _ Ortho _ Psych _ Infectious Discuse	Pediatrics Emergency Medicine Toxicology Shock Trauma GU) 🥥	
E. Corine Heme/Onc Neurology Skin Ortho Psych Infectious Discuse	e Heme/Onc Neurology Skin Ortho Psych Infectious Diocase	🛛 Cardiology 🗆 Pulmonary 🗌 GI 🗌 Renal 🔲 ENT 🔲 OB/GYN 🔲 Environmental		
] E. docrine 🗌 Heme/Onc 📋 Neurology 🗌 Skin 🗌 Ortho 📋 Psych 🔲 Infectious Disca	é	

You can then fill out the **background information** to help guide educators who use your case.

- 1) Click through the different tabs (Background, Play-of-Case, History, Physical, Debrief). I recommend writing the material with a word processor then **copy and paste** into the text fields. You can use formatting such as **Bold**, *Italics*, <u>Underline</u>.
- If you want to mark an incomplete section enter three asterisks in a row ("***").



Creating an ACTION:

To create an **action**, select the **Action Creator** tab. Here you can pre-script vital sign changes, designate **critical actions** and **branch points**, and automate scribe entries.

Vital sign changes can be *absolute* or *relative*, for example you can change the heart rate <u>to</u> 80 beats per minute or increase it <u>by</u> 8 beats per minute. I recommend using *absolute* vital sign changes to represent definitive actions, for example after intubation set HR, SPO2, ETCO2, BP, and RR to specific values. I recommend using *relative* vital sign changes to nudge the learners in one direction or another, for example a button labelled "Desat and RR Up" may change the SPO2 and RR by a fixed amount every time it is clicked, so it can be clicked more than once if there is an excessive delay to stabilizing the patient's breathing. To create an Action:

- Input the vital sign changes. Use the "Go to" for *absolute* changes and "Change by" for *relative* changes. If you want the change to be instant set the time to 0 seconds, otherwise they will change over the inputted number of seconds.
- Enter the button name with a maximum of 15 characters (use abbreviations as needed). Include a scribe description which may be longer than 15 characters.
- 3) Once you are satisfied with your action click **Create Action** which will add it to the **actions list**.
- 4) Select your **action** from the **action list** and review it. If you wish you make changes click the **edit** button.
- 5) Assign your action to be a **Critical Action** or a **branch point action** by clicking the corresponding **blank button**.



Creating a STIMULUS:

- 1) Enter the **Button name**.
 - a. If creating an **IMAGE stimulus**, select the appropriate tab and select the image category (e.g., CT, ECG, Ultrasound, etc.).
 - b. If creating a **TEXT stimulus**, select the appropriate tab and type the text in the **Output box**; you may use normal lab templates by clicking the appropriate buttons.
- 2) For an **IMAGE stimulus**, select the specific image. It will be displayed as a preview.
- 3) Click Create Stimulus
- 4) Select your stimulus from the list, and assign it by clicking a **blank button**.

	CaseWriter				- 🗆 ×
Case Information Action Creator Stimulus Creator	Case Information Action Creator Stimulus Creator		Operator's view		
		Image Preview	Control Background Pla	ay-of-Case Histo	ry Physical Debrief
Image Stimulus Text Stimulus Button Name E.g., "CBC & BMP"	Image Stimulus Text Stimulus Button Name Exam: Sweating	inage i review	E.g., "A 35 year old woma being stung by a bee."	an develops short	ness of breath after
Normal Lab Tomplatos	CT		Cell 1 Cell 2 Cell 3 C	Cell 4	
	ECG	Contraction of the second second	Vital sign changes		
CBC and BMP UA	Ultrasound	and the second second	ShockBetter		[]
Liver Coags VBG	Ankle Dislocation.jpg	and at a series	ShockWorse		[]
Output	Anterior Angioedema.jpg Battle sign.jpg	and the second	Critical Actions		
	Blown Left Pupil.jpg Blown Bight Bunil.jpg		[]	[]	[]
	Bullae.jpg		[]	[]	[]
Please stay in box	Clubbing.jpg	Stimuli —>	[]	[]	[]
	Corneal Ulcer.jpg Degloving injury of leg ipg	2 Clubbing	Stimuli		
	Dermal Ulcer with Eschar.jpg	3 CT Head 4 Exam: Sweating	ECG	ChestXR	Normal FAST
	Diagnostic Peritoneal Lavage revealing Onne.jpg Diaphoresis.jpg		CBC BMP	VBG	Urinalysis
	Digit Degloving Injury.jpg Dry Gangrene of Foot.jpg		LiverLabs	• [···]	[]
Create Stimulus	Create Stimulus	Delete	4		Save Case

Sharing a case:

Once you have completed your case, please share the benefit of your knowledge and experience with others! Click the **Upload** button to make it available to other simulation educators.

M Launcher	- 🗆 X			
Launcher Case Runner Data Analysis Instructions	About Settings			
1) Select a Case				
Favorites All Online My Cases	Case Summary			
 Struck by train (Femur fracture, arm amputatio Angioedema Med Sim Studio introduction case Anaphylaxis Gunshot wound to head Pneumothorax secondary to COPD exacerbati Diabetic ketoacidosis Septic Shock Secondary to Pneumonia Pneumothorax from Motor Vehicle Collision 	Title: Gunshot wound to head Author: Adam Blumenberg MD Date written: 12/02/2021 Summary: A case of gunshot wound to the head. The patient requires intubation and management of elevated intracranial pressure.			
 ↑ Favorite Upload Create Load cases ↓ Delete Edit 	~			
2 Select Layout:				
 Complete Streamlined 				

5) How to Collect and analyze data

You may use Med Sim Studio to more easily collect data during your simulation sessions. You can collect **Attendance**, learner survey feedback, Sim location/modality, time-stamped action logs of cases, and performance reviews. You can also create customized surveys for cases you've written.

Analyzing Data:

You can analyze some data via the Med Sim Studio application by selecting the **Data Analysis** tab. Here you can use select the **Search** tab and tailor a list of simulation education sessions to analyze. Selecting an **Individual Scenario** will give you details about that particular session, and selecting the **Totals** tab will give you information about all the cases on your tailored list.

🚺 Launcher	- 🗆 X
Launcher Case Runne, Data Analysis	nstructions About Settings
Scenario List	Totals Individual scenario Search
Jan 8, 2022 11:46:02 AM	
Jan 8, 2022 11:46:02 AM	Case start: Jan 8, 2022 11:46:02 AM
Jan 8, 2022 11:45:48 AM	Launcher mode: Complete
Jan 8, 2022 11:45:48 AM	Clock ran for: 00:00:01
Jan 8, 2022 11:45:32 AM	Monitor ran for: 00:00:08
Jan 8, 2022 11:45:32 AM	
	Attendance:
	Simulation educator:
	Simulation location: In-Situ (Emergency
	Department)
	Attendings: 0
	Senior residents: 0
	Junior residents: 0
	Medical students: 0
	Physician assistants: 0
	Medics: 3
	Nurses: 0
	Technicians: 0
	Nursing students: 0
	Other observers: 0
	Total learners: 3
Total: 6	

You may also access automatically saved logs from your simulation sessions. Med Sim Studio automatically saves a log for every session: one file is **plain text** and one file can be read with a **spreadsheet** program such as Microsoft Excel. The log files are available in the directory

"C:\Users\[YOURCOMPUTER]\Documents\MedSimStudio\Logs"





Collecting Data:

1) You can capture data from your <u>learner</u> groups by displaying a **QR code** on the **Display** monitor. Create a **QR code image** to your own survey (e.g., SurveyMonkey.com, or Qualtrics.com). Load your **QR code image** by clicking on the **Splash Screen** graphic in settings. This will replace the default splash screen with your image. At the end of your sim case click the **Med sim Studio Logo** on the **Control** window to toggle the **splash screen**.



- 2) You can capture attendance and location/modality data in the Control by selecting the Assessment→Attendance tab and filling it out during or after a simulation session. This will be saved and can be analyzed later
- 3) You can log learner performance reviews by selecting the Assessment tab.

Anonymous user data collection:

You may disable Med Sim Studio from sending me data about how you use it. No personally identifiable data is sent, and data packets are actively scrubbed of anything that could be personally identifiable. I will use data for quality improvement, case feedback, and to better understand how Med Sim Studio is used by medical educators.



Med Sim Studio

Developed by Adam Blumenberg, MD MA

2020 - 2021

Free to use and distribute.

I developed Med Sim Studio as a software platform that provides medical simulation educators a free and high-quality resource for in-situ sim (in hospital environment), remote learning (Zoom, WebEx, Skype, etc.), small groups (classroom), and sim laboratory education.

Med Sim Studio is free, so all you need is a windows computer with a second monitor.

Medical education is expensive, particularly to learners who are in training, practicing in developing countries, and students. Med Sim Studio is intended to be a free option for high quality medical education. Reducing cost-barriers in education will hopefully improve access, and lead to better physician performance and ultimately patient outcomes. In the spirit of the humanistic practice of medicine, I hope Med Sim Studio serves you well.

Sincerely, Adam Blumenberg MD MA

Thanks to my wife Krista and son Leo, my parents Miki and Jelena, my sister Lili and brother-in-law Andrew and to my friends.

Thanks to Florian Schwander for developing the excellent software "Vital Sign Simulator v1.4.3" which inspired this project.

Thanks to Jessica Stetz MD and Sigrid Wolfram MD who taught me medical simulation.

Thanks to David Kessler MD for support and mentorship.

Thanks to Mark Silverberg MD for providing over a hundred stimulus images and mentorship.

Thanks to Matt Riscinti and The POCUS Atlas for providing ultrasound images.

Thanks to Wikipedia Commons and radiopaedia for providing additional images.

Thanks to Columbia University Medical Center Department of Emergency Medicine for providing support.

Thanks to the Columbia University Simulation Technicians Branden Ford and Shenelle Alleyne for contributing to medical education.

Additional stimuli are anonymized images from my clinical practice.

Thanks to SUNY Downstate College of Medicine and the Downstate / Kings County Hospital Departments of Emergency Medicine for education and training.

Thanks to my colleagues, nurses, technicians, and patients.

Thanks to Drs. Elizabeth Sanseau and Marc Aurbach for suggestions and support.

Thanks to my Simulation colleagues, Drs. Janice Shin-Kim, Delna John, and Humaira Ali.

Thanks to Shawn Bruce for technical suggestions and beta testing.

Thanks to Beta testers who provided suggestions for software improvements including Drs. Paul Hein, Thomas Ihmann (additional thanks for assisting with the German translation), and Guilherme Resener.

Thanks to the following organizations for allowing reprints of simulation cases:

- American College of Emergency Physicians (ACEP)
- Emergency Medicine Resident Simulation Curriculum for Pediatrics (EM ReSCu Peds)
- Journal of Education and Teaching in Emergency Medicine (JETeM)

Additional thanks to my medical mentors: Drs. Rob G Hendrickson, Zane Horowitz, Sage Weiner, Rana Biary, Joel Gernsheimer, Kelly Maurellus, Allison Regan, Teresa Smith, Joshua Schecter, Marcus Little, Richart Sinert, Ian DeSouza, James Willis, Jane Kim, Antonia Quinn, Jason Chu, Mert Erogul, Samuel Marquez, Shirley Eisner.

The following additional radiological stimuli used with permission from www.radiopaedia.org

- Gunshot wound to head (Frontal): Case courtesy of Dr Bruno Di Muzio, Radiopaedia.org, rID: 30487
- Cervical vertebral body burst fracture with retropulsed fragment: Case courtesy of Dr Jeremy Jones, Radiopaedia.org, rID: 6150
- Cervical fracture dislocation C5-C6: Case courtesy of Dr Samir Benoudina, Radiopaedia.org, rID: 47581
- Fracture dislocation C6-C7.jpg: Case courtesy of Assoc Prof Frank Gaillard, Radiopaedia.org, rID: 4021
- Odontoid fracture type 2: Case courtesy of Dr Hani Makky Al Salam, Radiopaedia.org, rID: 9137
- Dense MCA sign (Left): Case courtesy of Dr Jeremy Jones, Radiopaedia.org, rID: 13190
- Dense MCA sign (Right): Case courtesy of Assoc Prof Frank Gaillard, Radiopaedia.org, rID: 17958