The OSI Model as applied to www.med-decision.com

Practical application of the OSI model
Psychopharmacotherapy is taking an increasingly prominent role in the treatment of psychiatric disorders. This is consistent with the increased knowledge of the neurobiological mechanisms that contribute substantially to mental health disorders. Healthcare organizations have adopted an economic model that would rather reimburse clinicians for a drug than time spent with a therapist. While this model has indeed changed the landscape for the treatment of mental disorders, it has de facto made psychologists, social workers, and other mental health clinicians more aware than ever that they must also be experts on the medications that their patients are being prescribed or abusing. To effectively practice in the contemporary healthcare systems and to promote better patient outcomes, understanding psychopharmacotherapy is a fact of life for all practitioners of the 'talking cure.'

Primarily due to the multitude of drugs that have been released onto the market and rapidity by which drugs are being approved, labeling changes regarding indications, dosing and potential side effects seem to be changing at an ever-increasing pace. Due to time and financial constraints, therapists and clinicians at every level are increasingly pressed for time and are understandably "behind the curve" in trying to stay current on this information. When drug questions concerning their patients arise, they have limited time to find the answer or answers that they are looking for.

One fundamental feature of this web application would be to include access to the most popular (iPhone, Droid etc) applications (apps). I believe that this particular feature is what may make this app unique and appealing to a broader range of professionals outside of therapists who also seek easily accessible yet current therapeutic information.

In addition, in May 2013 the Diagnostic and Statistical Manual-5 (DSM-5) was released. The DSM-5 was expected to significantly change the landscape of current diagnostic criteria for mental health clinicians. The primary purpose for writing this web application is to make it the primary 21st century source for drug information for psychiatry interns, residents and psychiatrists, psychiatric nursing and pharmacy students and licensed nursing and pharmacy clinicians, graduate clinical students starting their practicum up through practicing clinicians, and prescribing psychologists. Due to the advanced content and focus on clinical application, the app would not be considered relevant for most college undergraduates.

This application is intended as a swift, informative and practical reference that quickly highlights the most salient medications for clinicians and therapists in training and clinicians in practice. Additionally, there is no web application currently on the market that: 1) makes a priority to provide the most relevant, up to date information, with organized and easy to find information on drugs and drug action that is targeted for the use of mental health medical clinicians, clinical psychologists and other therapists; 2) to broaden the appeal and utility of the app by educational programs, the app will also provide detail on drug action, psychopharmacology of various classes of drugs, currently approved prescribing guidelines and major interactions with therapy; 3) additionally, such an app can be made even more accessible and "real-time" by providing apps that can provide the most current and relevant information that clinicians need to be aware of and

consider when treating patients. As part of this guidance within the app, an algorithm that takes into account important warnings, contradications and side effects will most importantly provide the clinician with a list of only the most relevant medications (ordered by priority) they should consider that the patient should be taking.
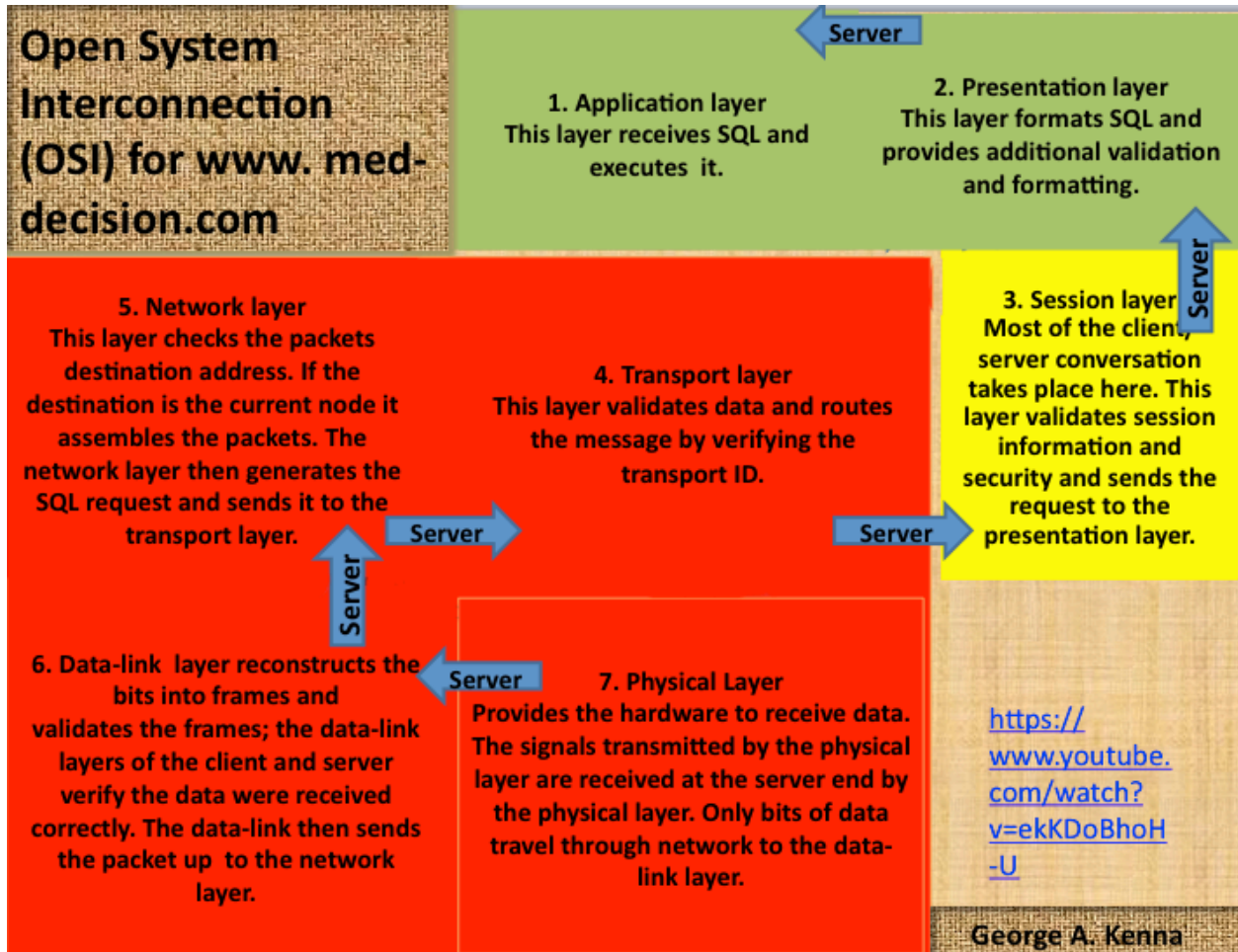
The diagram above exhibits the process first as concrete examples of the OSI-7 layers followed by the translation of data through the various layers into binary bits via the client then back again via the server. I have also reference a short 6 minute or so summary of the 7-layer OSI model courtesy of youtube.comhttps://www.youtube.com/watch?v=ekKDoBhoH-U.

Overview
This web application (as proposed above) could only take place on the web as there are too many moving parts to develop and continually update the algorithms required to successfully run this program as a client software package. Perhaps websites such as Dynamed.com or UpToDate.com approach to some degree of similarity but do not perform what I had in mind. The problem with Dynamed and UpToDate is that the search engines to use these data are not structured sufficiently to answer the basic question of "What is the best medication I should try with my specific patient and circumstances?" If you have the time you could read endless empirical research but be no closer to an answer using these 2 databases.

Such a program obviously uses all OSI-7 layers with an expected emphasis on the server programs to run the algorithms to answer the client inserted requests for guidance on a drug treatment for a given client inserted diagnosis. I used Powerpoint to present this structure as I decided that .pptx would be more visually descriptive than other programs (see WebArchitecture2.pptx.pptx). Unlike the Twitter example used in class, I started with the client Application (7) layer (webpage) moving through the subsequent layers to the client physical (1) to server physical and back again. As shown, the Twitter example as far as I can determine, incorrectly suggests that the tweet originates with the physical layer, which seems illogical. (I asked this question previously in my homework and was not answered.) While the Physical layer is indeed the first layer in the OSI model, I don't interpret that to mean that this layer supplants the Application layer as the beginning of the client-server interaction. I don't profess to have a sophisticated understanding of this material but need to try to understand the big picture of what the experience is like as an end-product user rather than focus entirely on all the layer-processes both hard and soft, that make up the sensual experiences that can be provided by a computer. For example, I understand entirely that there are many unseen steps involved with filming and transmitting a television program to a home viewer but I would rather try to understand the overall relationship as integrating both independent yet highly correlated data that provide different views (i.e. sending and receiving a transmission) of the same experience whether it's television or in my mind computers. After all, I remember the excitement of transmitting TV live the first time from Moscow via a satellite as we sat watching a reporter talk and we listened. From your feedback I know you don't agree with my thesis, but to me a computer provides a similar end-to-end experience yet with limitless possibilities for client and server to interact and to me that is all that matters.

Client to Server to Client
The client will use a web browser to open a TCP connection (via the transport layer) with the server at website **www.med-decision.com** (verification done at the session level) to establish a secure connection via the session layer in order to enter Data (e.g. patient data to assist in determining what the best medication would be to treat a particular disorder). In essence the client begins a request that goes through all-layers to the server website beginning with the Application layer. The client sees the Application layer via the web browser to access the web page and display all the data pertinent to the www.med-decision.com website. The web browser generates a request that is sent to the Presentation layer and is changed to a format (e.g. ASCII, JPG,GIF, PNG, WAV, HTML, JavaScript etc.) that can be translated and sent to the Session layer that establishes the connection between the client and server. Information relevant to the diagnosis of a psychiatric disorder will be entered. Since I am a specialist in the pharmacotherapy of Alcohol Use Disorders I will use this as an example.

After the session is established and validated the web server provides access to the web page and closes the connection. The client web browser translates the HTML of the web page and includes additional instructions regarding the placement of additional files that can be seen on the web page. The request is sent to the Transport layer (data are transferred into segments) opening a TCP connection to the web server requesting a web page. Each TCP connection is a session. Additionally the Transport layer generates error validation checksums (looking for errors) and breaks up the web page into segments and labels them for re-assembly before being sent to the

Network layer that takes the request, translates the segments into packets and identifies where the server is located using the IP protocol. To reach the web server on the internet, the IP protocol additionally allows the computer to determine how to reach the internet web server via the default gateway. The computer also creates a message that is addressed to the web server with the clients return address IP location. A cookie will be left after establishing an initial connection and log in to the server so that the next time a secure connection should be faster as the server will recognize the source of the data inquiry. Next, the Network layer (e.g. IPv4, routers) adds the address of the next node of a particular system of nodes, and adds a sequence number to route each packet of data to provide a map for reassembling the packets in the correct format. Subsequently once the request from the client browser has been created it is sent to the network card and the packets are sent to the Ethernet: first the Data-link layer (Wi-Fi, Ethernet, ATM, frame relay, switches) where headers and trailers are added to make frames are then sent to the Physical layer (e.g. hubs, repeaters, cables, optical fibers) which transforms the data into binary code via the default gateway (i.e. packets are transformed into frames that will be sent by the data-link layer) that includes my IP address 192.168.1.4 that is then transformed into binary code "11000000, 10000100, 00000001, 00000100" as well as additional binary coded data involving the data requested via the client Physical layer to the server Physical layer at www.med-decision .com; second, the binary signals transmitted by the Physical layer are received at the server end which passes the data on to the Data-Link layer that reconstructs the binary bits of data into frames and validates them, strips the header and trailer information from the packet and sends them up to the Network layer. Data is returned validating that the connection remains in place while the session is still open and waiting for the server to analyze the data input. As an answer is obtained the frames translated binary code is submitted back to the client through the Physical layer, frames converted by the Data-Link layer are then submitted for further processing into packets by the Network layer. The Network layer checks the packets destination address and if correct, reassembles the request and sends it on to the Transport layer and receiving an ID and validating the source of the data in the Transport layer. The Transport layer then makes additional checks and sends the request via the proper session that identifies and validates the request then sends it on to the Presentation layer. All the while the Session Layer maintains an open TCP as there are data passing through the line between server and client. The packets are then transformed back into HTML/CSS data language that is translated by the Presentation layer to the Application layer being readable for the client. The Presentation layer provides additional validation etc and sends the request on to the Application layer where the data are executed and made readable.

The Answer from www.med-decision.com
Relevant to the treatment of alcoholism, the actual data that will be entered by the client, will ask questions such as "average number of standardized drinking units/day over the past 30 days", "Number of DSM-5 criteria met for alcoholism, "gender", "age", "number of relatives with an Alcohol Use Disorder", "number of hospitalizations directly due to alcohol (i.e. detoxifications, pancreatitis etc)", "number of hospitalizations indirectly due to alcohol (i.e. accidents, assaults)", "previous medications used for alcoholism", "successful (yes/no)?", "medication allergies", "current medications", "days since last drink" and so forth, followed of course by some type of "Search" button. These answers will be entered into boxes created by the HTML/CSS computer language and the "Search" function will take the person through the Session layer that will link and keep the connection between the client data/computer and server. Segments will be

transported via the server IP address for analysis by the server. The "search" uses the criteria submitted by the client to choose the optimal choice of drug that should be used first (and/or an alternative (s)) in this particular patient. In this way, medicine is using state of the art clinical data to "tailor" the choice of a drug (e.g. naltrexone, topiramate, acamprosate, disulfiram) based on each individuals' characteristics or for that matter, potentially drugs for any specific psychiatric diagnosis or patient. At this time if the clinician is satisfied with the answer, logs off from the server, closes the application/presentation layers, the session is recognized as closed though the transport-network-data-link and physical layers.