

The National Medical Knowledge Bank: Commercialization Threshold

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What We Will Cover

- Project Description
- Current Applications
- Status and Plans
- Issues and Lessons Learned

National Medical Knowledge Bank

An Advanced Technology Program Joint Venture

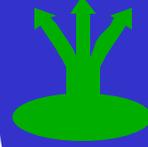
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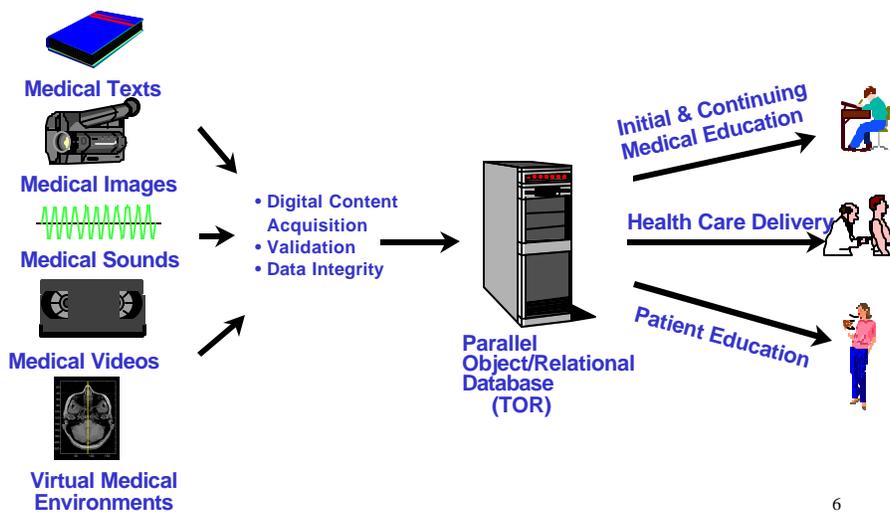
What is a Medical Knowledge Bank?

A knowledge bank is an advanced repository of specialized medical **experience and knowledge**, featuring easy capture of information, with **massive storage and links** to a vast selection of supporting resources enabling users to **retrieve, collaborate, and learn**, any time and place.

National Medical Knowledge Bank Value Proposition

The National Medical Knowledge Bank saves **time**, increases the **quality** of care, and reduces the overall **cost** of treatment and education through **focussed knowledge retrieval** and flexible collaboration.

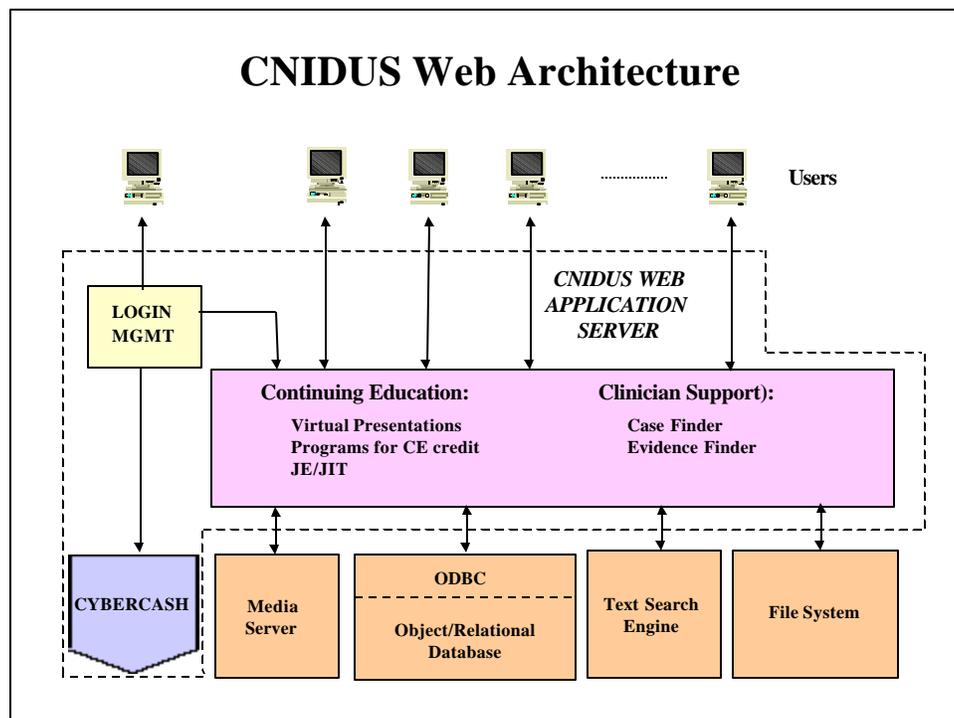
The NMKB Consortium is focused on developing the capabilities to deliver multimedia-based medical information services to three key markets.



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CNIDUS Knowledge Bank Web Site

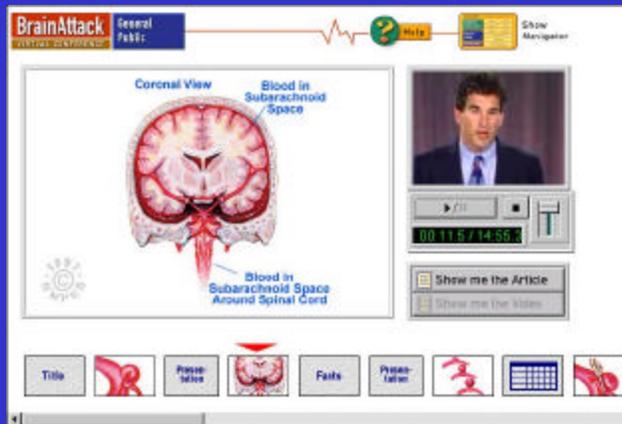
- CNIDUS - Ancient Greek medical school
- Targeted to healthcare practitioners
- Integrated applications
 - Virtual Medical Conferences
 - Nursing Training
 - Case Based Retrieval for Diagnosis/Treatment Determination
 - Disease Domain-specific Literature Search
- Offers Continuing Education credits
- Will use TOR as the scalable, parallel data repository



Applications

- **Virtual Presentations**
 - Brain Attack Conference
 - Primary Care Grand Rounds with JE/JIT
- **Continuing Nursing Education**
- **Case Finder**
- **Evidence Finder**

Brain Attack Conference - Video with Slide Indexing



- Asynchronous, discretionary viewing
- Lower cost option (travel, time)
- Concept searching
- CME credit, including JE/JIT
- Indexed presentation outlines for fast navigation
- Streaming video/audio with synchronized slides

Primary Care Grand Rounds - Contents and Presentation

The screenshot displays the GNIDUS website interface. At the top, there are links for 'ENROLLMENT' and 'LOGIN'. Below this, the title of the presentation is 'Medical Aspects of Non-Small Cell Carcinoma of the Lung, Mitchell Margolis, M.D.'. A 'Contents' sidebar on the left lists various topics, including 'Introduction', 'Cancer Statistics', 'Diagnosis', 'Staging', and 'Paraneoplastic Syndromes'. The main content area shows a CT scan of the chest and a small video window with a speaker. The bottom of the page has a progress bar and a '00:26:45/01:00' timer.

Intelligent Agent-based Continuing Education - Activity Menu

The screenshot shows a web browser displaying an 'Activity Menu' for a case study titled 'Fatigue: Patient M.J.'. The menu is circular and contains several activity options: 'Review patient chart', 'Conduct HPI interview', 'Perform physical exam', 'Develop plan of care', 'Conduct ROS interview', and 'Review case scenario'. A central box provides patient details for M.J., including age, gender, ethnicity, primary care setting, and chief complaint. The page also includes a search bar and a 'Click on an activity to begin.' instruction.

- Delivers personalized, active education experience
- Problem-based learning
- At convenience of student schedule; can complete in multiple sessions
- Certified CNE credit
- Reusable framework; lowers production cost
- Agent technology - lesson planning; student model; tutor; ontology
- Applicable to other domains

IA-based Continuing Education - HPI Video Interview

- Patient interview video vignettes (streaming video)
- Student selects questions and orders them
- Student evaluated on question choice and order

Case Finder - Retrieval of Similar Cases

Target Case 6	Case 21	Case 23	Case 24	Case 25
Onset: acute (hours)	Onset: acute (hours)	Onset: acute (hours)	Onset: subacute (days-weeks)	Onset: subacute (days-weeks)
Duration: hours	Duration: hours	Duration: hours	Duration: days	Duration: days
Temporal Pattern: worsening	Temporal Pattern: constant	Temporal Pattern: worsening	Temporal Pattern: constant	Temporal Pattern: constant
Problem:	Subarachnoid hemorrhage caused by left side carotid artery aneurysm	Subarachnoid hemorrhage caused by anterior communicating artery aneurysm	Subarachnoid hemorrhage caused by basilar apex aneurysm	Subarachnoid hemorrhage caused by basilar apex aneurysm
Findings:	CT Scan: subarachnoid hemorrhage CT: subarachnoid hemorrhage CT: 3rd cerebral ventricle blood CT: hydrocephalus Angiography: carotid artery aneurysm Angiography: internal carotid artery aneurysm	CT: middle cerebral arteries subarachnoid hemorrhage Angiography: anterior communicating artery aneurysm	Lumbar Puncture: spinal fluid blood angiography: basilar artery aneurysm (LHA)	Lumbar Puncture: spinal fluid blood angiography: basilar artery aneurysm (LHA)

- Uses **Case-Based Reasoning** to Find “Similar” Cases
- Eases clinician’s burden of reading and recalling cases
- Saves clinician time
- Web-based; works with any ODBC database
- Matches complex data

Case Finder - Case Detail

Case Finder	Target Selector	Case Matcher	Case Browser	Help
Case Id:	40	Case Start Date:	Mon Aug 12 1996	
Organization:	New York University - Department of Neurosurgery	Patient Information:	57 year old right handed hispanic female	
Case Description:	Microsurgical Clipping of Basilar Artery Apex Aneurysm			
<p>Problems Histories Physicals Neuro Exams Tests Treatments Outcomes References</p>				
<p>Image 1. Image 2. Image 3. Image 4.</p>				
Treatment:	1. right pterional craniotomy of 1			
Reason:				
Goal:				
Procedure:	The patient underwent a right pterional craniotomy, with a transylvian, "half and half" approach to this aneurysm, and satisfactory clipping. The actual aneurysm was much larger than the portion which filled on the angiogram.			



Evidence Finder: Query

<p>Key Disorders</p> <ul style="list-style-type: none"> <input type="checkbox"/> Diabetes <input type="checkbox"/> Lipid Disorders <input type="checkbox"/> Stroke <input type="checkbox"/> Asthma <input type="checkbox"/> Osteoporosis <input type="checkbox"/> A I D S <input type="checkbox"/> Pneumonia <input type="checkbox"/> Heart Failure <input type="checkbox"/> Hypertension <input type="checkbox"/> Preop Consults 	<p>Subtopic</p> <ul style="list-style-type: none"> <input type="checkbox"/> Epidemiology <input type="checkbox"/> Prevention <input type="checkbox"/> Diagnosis <input type="checkbox"/> Screening <input type="checkbox"/> Treatment <input type="checkbox"/> Non-pharm Rx <input type="checkbox"/> Outcomes <input type="checkbox"/> Cost-Effectiveness 	<p>Study Method</p> <ul style="list-style-type: none"> <input type="checkbox"/> Randomized <input type="checkbox"/> Trial <input type="checkbox"/> Case Study <input type="checkbox"/> Population Study <input type="checkbox"/> Guidelines <input type="checkbox"/> Review Article <input type="checkbox"/> Meta-Analysis <input type="checkbox"/> Cost Benefit Analysis 	<ul style="list-style-type: none"> “Essence of the essence” of recent published literature: abstracts and “pearls” Evidence-based; categorized by evidence quality Reduces need for colleague consultation Accessible, intuitive, relevant “Think with me” functionality
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Enter words or phrases, separated by commas:

glucophage



Evidence Finder: Results

You matched 6 out of 121 documents

<p><u>Efficacy of metformin in patients with non-insulin-dependent diabetes mellitus. The Multicenter Metformin Study Group</u></p>	<p><i>In obese patients with poorly controlled type 2 diabetes on diet alone, use of metformin titrated to maximal dosage or fasting plasma glucose of <140 mg/dl resulted in significantly improved average glycemic control, compared to placebo. ...</i></p>
<p><u>Minority Issues in the Management of Diabetes Mellitus - Recommendations</u></p>	<p><i>Presented by James Gavin, M.D. at MCP Hahnemann University on 3/3/99 [0 CME credits]</i></p>



Evidence Finder: Results

EVIDENCE BASED MEDICINE INDEXED DOCUMENT RETRIEVAL

Treatment Pharmacologic (Randomized Control-Certified)

Pearl

In obese patients with poorly controlled type 2 diabetes on diet alone, use of **<metformin>** titrated to maximal dosage or fasting plasma glucose of <140 mg/dl resulted in significantly improved average glycemic control, compared to placebo (hemoglobin A1C 7.1% vs. 8.6%, respectively). In a second study, obese patients with poorly controlled type 2 diabetes despite maximal glyburide therapy had improved glycemic control on glyburide plus **<metformin>** (titrated as above) compared to those remaining on glyburide alone (hemoglobin A1C 7.1% vs. 8.7%, respectively). Patients changed from maximal glyburide to titrated dose **<metformin>** had minimal improvement in average glycemic control.

Abstract

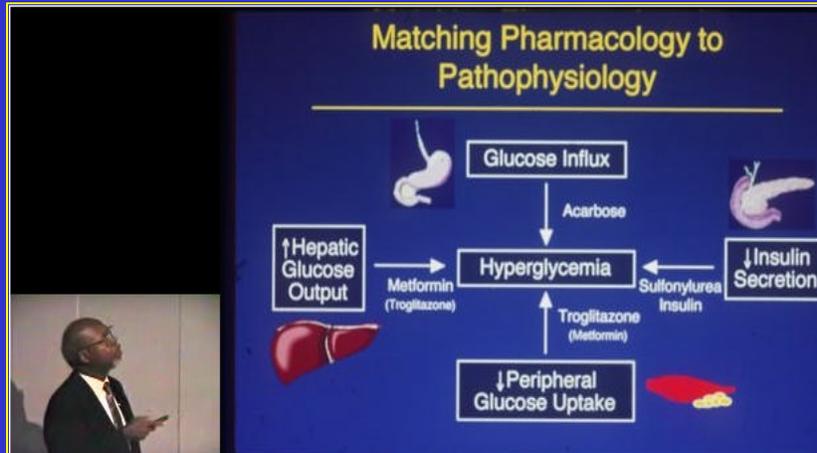
BACKGROUND: Sulfonylurea drugs have been the only oral therapy available for patients with non-insulin-dependent diabetes mellitus (NIDDM) in the United States. Recently, however, **<metformin>** has been approved for the treatment of NIDDM. ...





Evidence Finder: Results

MULTIMEDIA DOCUMENT RETRIEVAL, WITH CME CREDIT, INDEXED BY "KNOWLEDGE-ELEMENT"



Status and Plans

- All applications running on integrated web site (CNIDUS)
- Commercial launch in late 2000
- Evaluating business organization model for going forward after project end

Joint Venture Organization

- Multiple Companies can offer:
 - Broader experience, and unique skills
 - Access to more resources
 - Different channels to market
- Need to be Prepared to Deal with Change
 - Restructuring, spin-offs, name changes
 - Financial fluctuations
 - Individual organization goal changes

Joint Venture Organization (cont.)

- Cultural/Managerial Differences
 - Short term outlook vs. long term outlook
 - Inter-company task management issue
 - Collaborative decision-making slows down the process
- Development Environment Issues
 - Technology is moving target and forces adjustments
 - Geographic separation makes planning and integration difficult

Lessons Learned

- Listen and be willing to understand and compromise on development objectives .
- Have a written master plan. Define terms!
- Understand users environment and not be afraid of making changes to accommodate changes in the market
- Be prepared for inevitable personnel changes
- Have regular teleconferences, maintaining open communications to improve understanding, and put things in writing
- Develop overriding architecture early and keep reviewing
- Watch the technical environment and incorporate change
- Use yearly demo commitment to establish hard deadlines and help focus team
- Keep technical planning and commercialization planning in sync.
- Hold quarterly technical workshops with standing working committees to maintain standards, ontologies, and architecture
- Communicate, Communicate, Communicate

Intellectual Property Rights

- Intellectual Property Issues are Complex and there Must be Agreement
 - Clarify ownership of any IP that is jointly developed
 - Revenue sharing
 - Right to use in non-JV related developments
 - Profit and non-profit companies deal with IP very differently
 - Non-profits will typically not use IP in future developments
 - Profit organizations will look to leverage and use IP as a competitive advantage
 - Resolution of IP issues takes time, energy, and money
- Lessons Learned
 - Be meticulous up front on IP ownership and potential revenue sharing
 - Document agreements and get all parties directly involved in resolving the issue of IP

Interested in Learning More?

Come see our demo!

Are you a potential
User or User Representative?
Content Provider?
Sponsor?
Investor?

Contact us!!

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