Health Self-Care as a Complex, Lifelong Career: Implications for Patients, Providers, and Policy Makers

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University of Delaware
July 5, 2006

Medici Conference, Center for Positive Psychology
University of Pennsylvania
Questions

• Why is health self-care a job?
• What’s IQ got to do with health?
• What’s physical health (or IQ) got to do with subjective well-being?
• If we can’t change IQ, isn’t it a dead-end—a pessimistic stance—to study the impact of IQ on health?
Individual Differences in Development

**Personal (behavioral phenotype)**
- Interests (“will do”)
- Abilities (“can do”)
- Energy

**Interpersonal**
- Social ties
- Emotional support
- Guidance

**Material**
- Shelter
- Medical care
- Amenities

**Biological**
- Nutrition
- Safe environment
- Genetic constitution

**Resources**
- Genetic constitution

**Outcomes (obj.)**
- Knowledge
- Wisdom
- Virtue
- Connectedness
- Leadership
- Honor
- Occupation
- Wealth
- Comfort
- Health
- Beauty
- Offspring

**Well Being (sub.)**
- Self-respect
- Fulfillment
- Joy, happiness
- Peace, grace

*My research*
IQ Predicts Performance in Many Life Arenas, But Not Equally Well

- Standardized academic achievement: $r = 0.8$
- Job performance—complex jobs
- Years of education: $r = 0.6$
- Occupational level
- Job performance—middle-level jobs: $r = 0.4-0.5$
- Income: $r = 0.3-0.4$
- Delinquency: $r = -0.25$
- Job performance—simple jobs: $r = 0.2$

$g = \text{The general mental ability factor; a general facility at learning & reasoning}$
IQ Predicts Performance Best in Most Complex Jobs

IQs of applicants for:

- Attorney, Engineer: 108-128
- Teacher, Programmer: 100-120
- Secretary, Lab tech: 96-116
- Meter reader, Teller: 91-110
- Welder, Security guard: 85-105
- Packer, Custodian: 80-100
IQ/g Level Affects Trainability

- IQ 70: Slow, simple, concrete, one-on-one instruction
- IQ 80: Very explicit, structured, hands-on
- IQ 90: Mastery learning, hands-on
- IQ 100: Learns well in college format
- IQ 110: Can gather, infer information on own
- IQ 120: Written materials & experience
- IQ 130: No. of people

MR (70) to MG (130) IQ Scale
IQ Predicts Mortality: Example

• IQ at Age 18

<table>
<thead>
<tr>
<th>Australian veterans followed to age 40</th>
<th>Death rate per 10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ: above 115</td>
<td>51.3</td>
</tr>
<tr>
<td>100-115</td>
<td>51.5</td>
</tr>
<tr>
<td>85-100</td>
<td>92.2</td>
</tr>
<tr>
<td>80- 85</td>
<td>146.7</td>
</tr>
</tbody>
</table>

“People with lower IQ may have a poorer ability to assess risks and, consequently, may take more risks in their driving.”

1 more IQ point = 1% lower death rate
What is Good Health?

The physiological system is:

• Under control, functioning optimally
• Resists perturbation, recovers quickly
• Crucial parts intact, functional, & without premature wear or incubating problems
• Facilitates pursuit of owner’s goals
Minding That System Is a Lifelong Job

- Constellation of tasks to perform, actions to avoid
- Training required
- Coordinate & communicate with others
- Exercise independent judgment
- Only occasional supervision
- Job changes as technology & conditions evolve
- Sometimes tiring, frustrating, affects family life
- Central to personal well-being
- But no vacations, no retirement
Major Forms of Death & Disease

• Chronic illnesses (heart disease, cancer, etc.)
  – Middle-age & older

• Unintentional ("accidental" injury)
  – Childhood & early adulthood

All are “preventable.”
Avoiding Chronic Illness Requires Foresight & Prevention

- Keep informed
- Live healthy lifestyle
- Get preventive checkups
- Detect signs and symptoms
- Seek timely, appropriate medical attention
Chronic Illnesses Require Self-Regulation

• Follow treatment regimen
  – Use medications as prescribed
  – Diet, exercise, no smoking, etc.
  – Including for diseases without outward signs (e.g., hypertension)
• Monitor daily signs and symptoms
• Adjust medication and behavior in response to signs
• Have regular check-ups
Daily Life is Full of Hazards

You idiot! You were shaving and using your palm pilot instead of driving!

If you hadn't been sending a fax while playing with your GPS system, you moron!
Avoiding Accidents Requires “Defensive Driving”

- Recognize hazards
- Prevent incidents starting
- Halt progress of incidents
- Limit damage during incidents
- Recover and redesign

• Same process as with chronic illnesses
• Myriad low-probability, often-hidden hazards
• Damage usually small, but it cumulates
A Diabetic’s Job

• **Learn about diabetes in general (At “entry”)**
  – Physiological process
  – Interdependence of diet, exercise, meds
  – Symptoms & corrective action
  – Consequences of poor control

• **Apply knowledge to own case (Daily, Hourly)**
  – Implement appropriate regimen
  – Continuously monitor physical signs
  – Diagnose problems in timely manner
  – Adjust food, exercise, meds in timely and appropriate manner

• **Coordinate with relevant parties (Frequently)**
  – Negotiate changes in activities with family, friends, job
  – Enlist/capitalize on social support
  – Communicate status and needs to HCPs

• **Update knowledge & adjust regimen (Occasionally)**
  – When other chronic conditions or disabilities develop
  – When new treatments available
  – When life circumstances change
Good Performance=Adherence

• **IT IS NOT** mechanically following a recipe
• **IT IS** keeping a complex system under control in often unpredictable circumstances
  – Coordinate a regimen having multiple interacting elements
  – Adjust parts as needed to maintain good control of system buffeted by many other factors
  – Anticipate lag time between (in)action and system response
  – Monitor advance “hidden” indicators (blood glucose) to prevent system veering badly out of control
  – Decide appropriate type and timing of corrective action if system veering off-track
  – Monitor/control other shocks to system (infection, emotional stress)
  – Coordinate regimen with other daily activities
  – Plan ahead (meals, meds, etc.)
    • For the expected
    • For the unexpected and unpredictable
  – Prioritize conflicting demands on time and behavior

Very complex and demanding!
But what specifically makes a job or task more cognitively complex? (i.e., tax lower-g individuals more heavily)
Clues From Job Analyses: Behavioral Demands

Complex jobs require workers to: (Arvey, 1986)

<table>
<thead>
<tr>
<th>Behavioral Demand</th>
<th>Correlation with overall job complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn and recall relevant information (symptoms)</td>
<td>.75</td>
</tr>
<tr>
<td>Reason and make judgments (timely preventive care)</td>
<td>.71</td>
</tr>
<tr>
<td>Deal with unexpected situations (meal delayed)</td>
<td>.69</td>
</tr>
<tr>
<td>Identify problem situations quickly (hazards)</td>
<td>.69</td>
</tr>
<tr>
<td>React swiftly when unexpected problems occur (injuries, asthma attack)</td>
<td>.67</td>
</tr>
<tr>
<td>Apply common sense to solve problems</td>
<td>.66</td>
</tr>
<tr>
<td>Learn new procedures quickly (treatment regimens)</td>
<td>.66</td>
</tr>
<tr>
<td>Be alert &amp; quick to understand things (feverish child)</td>
<td>.55</td>
</tr>
</tbody>
</table>
Plan, Anticipate Problems

“Shhhh. Zog! ... Here come one now!”
### More Clues: Task Demands

<table>
<thead>
<tr>
<th>Complex</th>
<th>Self-direction</th>
<th>Reason</th>
<th>Update knowledge</th>
<th>Analyze</th>
<th>Lack of structure</th>
<th>Criticality of position</th>
<th>Combine information</th>
<th>Advise</th>
<th>Write</th>
<th>Plan</th>
<th>Negotiate, Persuade</th>
<th>Coordinate</th>
<th>Instruct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td>-0.73</td>
<td>-0.56</td>
<td>-0.56</td>
<td>-0.49</td>
<td>-0.36</td>
<td>-0.36</td>
<td>-0.49</td>
<td>-0.71</td>
<td>-0.71</td>
<td>-0.71</td>
<td>-0.71</td>
<td>-0.71</td>
<td>-0.71</td>
</tr>
<tr>
<td>Teller</td>
<td>-0.51</td>
<td>-0.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attorney</td>
<td>0.88</td>
<td>0.86</td>
<td>0.85</td>
<td>0.83</td>
<td>0.79</td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Clues:**
- Lack of structure
- Self-direction
- Criticality of position
- Supervision
- Analyze
- Update knowledge
- Reason
- Transcribe
- Repetitive
- Physical exertion
- Supervision
- Combine information
- Advise
- Write
- Plan
- Negotiate, Persuade
- Coordinate
- Instruct
Common Building Blocks of Task Complexity

- **Individual tasks**
  - Abstract, unseen processes; cause-effect relations
  - Incomplete or conflicting information; much information to integrate; relevance unclear
  - Inferences required; operations not specified
  - Ambiguous, uncertain, unpredictable conditions
  - Distracting information or events
  - Problem not obvious, feedback ambiguous, standards change

- **Task constellation** *(Often neglected, even in job analyses)*
  - Multi-tasking, prioritizing
  - Sequencing, timing, coordinating
  - Evolving mix of tasks
  - Little supervision; need for independent judgment
Item Complexity & Error Rates in Health Literacy Surveys

- Items simulate everyday health tasks
- Analyses of what increases item difficulty (error rates)
- Increasingly difficult tasks can use the same info

Sample item from the HALS

---

**Pediatric Dosage Chart**

<table>
<thead>
<tr>
<th>Age</th>
<th>Weight Range</th>
<th>Drops</th>
<th>Syrup</th>
<th>Chewables 80 mg</th>
<th>Chewables 160 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>† Under 3 mo</td>
<td>Under 13 lb</td>
<td>½ dropper</td>
<td>½ tsp</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>† 3 to 9 mo</td>
<td>13-20 lb</td>
<td>1 dropper</td>
<td>½ tsp</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>† 10 to 24 mo</td>
<td>21-26 lb</td>
<td>1 ⅓ droppers</td>
<td>⅔ tsp</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2 to 3 yr</td>
<td>27-36 lb</td>
<td>2 droppers</td>
<td>1 tsp</td>
<td>2 tablets</td>
<td>—</td>
</tr>
<tr>
<td>4 to 5 yr</td>
<td>36-43 lb</td>
<td>3 droppers</td>
<td>1 ½ tsp</td>
<td>3 tablets</td>
<td>1 ½ tablets</td>
</tr>
<tr>
<td>6 to 8 yr</td>
<td>44-62 lb</td>
<td>—</td>
<td>2 tsp</td>
<td>4 tablets</td>
<td>2 tablets</td>
</tr>
<tr>
<td>9 to 10 yr</td>
<td>63-79 lb</td>
<td>—</td>
<td>2 ½ tsp</td>
<td>5 tablets</td>
<td>2 ½ tablets</td>
</tr>
<tr>
<td>11 yr</td>
<td>80-89 lb</td>
<td>—</td>
<td>3 tsp</td>
<td>6 tablets</td>
<td>3 tablets</td>
</tr>
<tr>
<td>12 yr and older</td>
<td>90 lb &amp; over</td>
<td>—</td>
<td>3-4 tsp</td>
<td>6-8 tablets</td>
<td>3-4 tablets</td>
</tr>
</tbody>
</table>

† Give with physician's permission.

Dosage: Each 0.8 ml dropper contains 80 mg (1.23 grains) acetaminophen.

Syrup: Each 5 ml teaspoon contains 160 mg (2.44 grains) acetaminophen.

Chewables: Regular tablets contain 80 mg (1.23 grains) acetaminophen each. Double strength tablets contain 160 mg (2.44 grains) acetaminophen each.

Reprinted with permission.
#1—Underline sentence saying how often to administer medication

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<th>Dosage</th>
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<td>Under 13 lb</td>
<td>½ dropper</td>
<td>¼ tsp</td>
<td>—</td>
</tr>
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<td>13-20 lb</td>
<td>1 dropper</td>
<td>½ tsp</td>
<td>—</td>
</tr>
<tr>
<td>† 10 to 24 mo</td>
<td>21-26 lb</td>
<td>1½ dropper</td>
<td>¾ tsp</td>
<td>—</td>
</tr>
<tr>
<td>2 to 3 yr</td>
<td>27-35 lb</td>
<td>2 droppers</td>
<td>1 tsp</td>
<td>2 tablets</td>
</tr>
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</tr>
</tbody>
</table>

* Consult with physician before administering to children under the age of 3 years.

Dosage may be given every 4 hours as needed but not more than 5 times daily.

Mean = 272

% US adults routinely functioning below this level? 20%

Caution! Could train them do this item, but not all possible ones

HALS LEVELS:

<table>
<thead>
<tr>
<th>Below Level 1</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>HALS SCORES:</td>
<td>175</td>
<td>225</td>
<td>275</td>
<td>325</td>
<td>375</td>
</tr>
</tbody>
</table>

• One piece of info
• Simple match
• But lots of irrelevant info
#2—How much syrup for 10-year-old who weighs 50 pounds?

<table>
<thead>
<tr>
<th>Age</th>
<th>Approximate Weight Range*</th>
<th>Drops</th>
<th>Syrup</th>
<th>Dosage</th>
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<td>—</td>
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<td>† 10 to 24 mo</td>
<td>21-26 lb</td>
<td>1½ droppers</td>
<td>1½ tsp</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2 to 3 yr</td>
<td>27-35 lb</td>
<td>2 droppers</td>
<td>2 tsp</td>
<td>2 tablets</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4 to 5 yr</td>
<td>36-42 lb</td>
<td>3 droppers</td>
<td>3 tsp</td>
<td>3 tablets</td>
<td>1½ tablets</td>
<td>—</td>
</tr>
<tr>
<td>6 to 8 yr</td>
<td>44-62 lb</td>
<td>—</td>
<td>2 tsp</td>
<td>4 tablets</td>
<td>2 tablets</td>
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* Consult with physician before administering to children under the age of 2 years. Dosage may be given every 4 hours as needed but not more than 5 times daily.

How Supplied:
Drops: Each 0.8 ml dropper contains 80 mg (1.23 grains) acetaminophen.
Syrup: Each 5 ml teaspoon contains 160 mg (2.46 grains) acetaminophen.
Chewables: Regular tablets contain 80 mg (1.23 grains) acetaminophen each. Double-strength tablets contain 160 mg (2.46 grains) acetaminophen each.

* If child is significantly under- or overweight, dosage may need to be adjusted accordingly.

The weight categories in this chart are designed to approximate effective dose ranges of 10-15 milligrams per kilogram.

Reprinted with permission, © 1988, Bristol-Myers Pharmaceutical and Nutritional Group.
#2—How much syrup for 10-year-old who weighs 50 pounds?

Pediatric Dosage Chart

![Dosage Chart]

- Spot & reconcile conflicting info
- Inference from ambiguous info
- Multiple features to match

% US adults routinely functioning below this level? 46%

HALS LEVELS:  
- Below Level 1  
- Level 1  
- Level 2  
- Level 3  
- Level 4  
- Level 5

HALS SCORES:  
- 175  
- 225  
- 275  
- 325  
- 375  
- 500

Mean = 272
#3—Your child is 11 years old and weighs 85 pounds. How many 80 mg tablets can you give in 24-hr period?

- Multiple features to match
- Two-step task
- Infer proper math operation
- Select proper numbers to use
- Ignore the most obvious but incorrect number
- Calculate the result

<table>
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<tr>
<th>Age</th>
<th>Approximate Weight Range*</th>
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<th>Chewables 160 mg</th>
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<td>½ tsp</td>
<td>—</td>
<td>—</td>
</tr>
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<td>½ tsp</td>
<td>—</td>
<td>—</td>
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<td>21-26 lb</td>
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<td>½ tsp</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
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<td>27-35 lb</td>
<td>2 droppers</td>
<td>1 tsp</td>
<td>2 tablets</td>
<td>—</td>
</tr>
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<td>36-43 lb</td>
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Consult with physician before administering to children under the age of 2 years.
Dosage may be given every 4 hours as needed but not more than 5 times daily.

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The weight categories in this chart are designed to approximate effective dose ranges of 10-15 milligrams per kilogram.
(Current Pediatric Diagnosis and Treatment, 8th ed. Chi Kempe and HK Silver, ed. Lange Medical Publications: 1984, p. 1079)
© 1988, Bristol-Myers Pharmaceutical and Nutritional Group.
#3—Your child is 11 years old and weighs 85 pounds. How many 80 mg tablets can you give in 24-hr period?

- Multiple features to match
- Two-step task
- Infer proper math operation
- Select proper numbers to use
- Ignore the most obvious but incorrect number
- Calculate the result

"Below minimum standard for today’s labor market"

% US adults routinely functioning below this level? 99%

<table>
<thead>
<tr>
<th>HALS LEVELS:</th>
<th>Below Level 1</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
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<td>325</td>
<td>375</td>
<td>500</td>
</tr>
</tbody>
</table>
Patient Performance on Other Health Literacy (TOHFLA) Items

Patients examine the actual vials or documents

<table>
<thead>
<tr>
<th>% of urban hospital outpatients not knowing:</th>
<th>Health literacy level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V-low</td>
</tr>
<tr>
<td>How to take meds 4 times per day</td>
<td>24</td>
</tr>
<tr>
<td>When next appointment is scheduled</td>
<td>40</td>
</tr>
<tr>
<td>How many pills of a prescription to take</td>
<td>70</td>
</tr>
<tr>
<td>What an informed consent form is saying</td>
<td>95</td>
</tr>
</tbody>
</table>

Many professionals have no idea how difficult these “simple” things are for others
### Error Rates Among Diabetics

<table>
<thead>
<tr>
<th>Urban hospital outpatients:</th>
<th>Health literacy level</th>
</tr>
</thead>
<tbody>
<tr>
<td>% diabetics <em>not</em> knowing that:</td>
<td>V-low</td>
</tr>
<tr>
<td><strong>Signal:</strong> Thirsty/tired/weak usually means blood sugar too high</td>
<td>40</td>
</tr>
<tr>
<td><strong>Action:</strong> Exercise lowers blood sugar</td>
<td>60</td>
</tr>
<tr>
<td><strong>Signal:</strong> Suddenly sweaty/shaky/hungry usually means blood sugar too low</td>
<td>50</td>
</tr>
<tr>
<td><strong>Action:</strong> Eat some form of sugar</td>
<td>62</td>
</tr>
</tbody>
</table>
Cognitive Barriers Rise

- As treatments become more complex
- As individuals age (more illness, less cognitive ability)
"Okay your father managed to get a mouse. Now how do we use it?"
Some Complexity Is Needless!

Confusing forms, handouts, labels; clinic layout, provider’s vocabulary, etc.
INDICATIONS: These Maximum Strength Tablets contain four effective ingredients for the temporary relief of these major cold and flu symptoms: A Nasal Decongestant — to relieve stuffy nose and sinus congestion. An Antihistamine — to dry up runny nose and relieve sneezing. A Cough Suppressant — to quiet cough. A Non-aspirin Analgesic — to relieve headache, fever, minor sore throat pain and body aches and pain.

DIRECTIONS: Adults: 2 tablets every 6 hours while symptoms persist, not to exceed 8 tablets in 24 hours, or as directed by a doctor. Children under 12: Consult a doctor.

WARNINGS: KEEP THIS AND ALL OTHER MEDICATIONS OUT OF THE REACH OF CHILDREN. IN CASE OF ACCIDENTAL OVERDOSE, SEEK PROFESSIONAL ASSISTANCE OR CONTACT A POISON CONTROL CENTER IMMEDIATELY. PROMPT MEDICAL ATTENTION IS CRITICAL FOR ADULTS AS WELL AS FOR CHILDREN. DO NOT NOTICE ANY SIGNS OR SYMPTOMS UNTIL they are present. Consult a health professional before using this product. Do not give this product to children under 12 years of age ever for more than 3 days. Symptoms do not improve within 7 days, or help less symptoms occur, consult a doctor. Do not exceed recommended dosage.

Only 61% of adults

Back of a box of cold medicine

Cluttered
Poor chunking
Key points buried
Hard words

emphysema or chronic bronchitis, or if you have heart disease, high blood pressure, thyroid disease, diabetes, glaucoma or difficulty in urination due to enlarged prostate gland. May cause dizziness, high blood pressure or nervousness. May cause dry mouth, constipation, or increase in blood pressure if you are taking sedatives or tranquilizers without first consulting your doctor. Use caution when driving a motor vehicle or operating machinery. May cause excitability, especially in children.

ALCOHOL WARNING: If you generally consume 3 or more alcohol-containing drinks per day, you should consult your physician for advice on when and how you should take this product and other pain relievers.

DRUG INTERACTION PRECAUTION: Do not use this product if you are now taking a prescription monoamine oxidase inhibitor (MAO I) (certain drugs for depression, psychiatric or emotional conditions, or Parkinson's disease), or for two weeks after stopping the MAOI drug. If you are uncertain whether your prescription drug contains an MAOI, consult a health professional before taking this product.

ACTIVE INGREDIENTS (PER TABLET): Acetaminophen 500mg; Dextromethorphan HBr 15mg; Chlorpheniramine Maleate 2mg; Pseudoephedrine HCl 30mg.

OTHER INGREDIENTS: Carnauba Wax, Croscarmellose Sodium, D&C Yellow No. 10 Aluminum Lake, FD&C Red No. 40 Aluminum Lake, Hydroxypropyl Methylcellulose, Magnesium Stearate, Microcrystalline Cellulose, Polydextrose, Polymethylene Glycol, Povidone, Sodium Starch Glycolate, Starch, Stearic Acid, Titanium Dioxide, Triacetin.

STORE AT ROOM TEMPERATURE.

*This product is not manufactured or distributed by Bristol-Myers Products, distributor of Comtrex®.

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Ways to Simplify

Such as simpler words
But Much Complexity Is Inherent: Examples from Diabetes

- **Known cognitive hurdles**
  - Abstract concepts in meal planning: carbohydrates (“includes sugar, but not pasta”)
  - Immediate costs and benefits are favored over future benefits and costs (cheating on one’s diet, failure to monitor blood glucose)

- **Underappreciated**
  - Assuming that non-adherence which causes no obvious immediate harm isn’t dangerous (DKA from failing to take insulin for several days)
  - False security from not grasping abstract concepts of risk, probability, & cumulative damage (“Not planning ahead/not testing myself hasn’t gotten me in trouble, so there is no need for it.”)
  - Not knowing when a deviation is big enough or frequent enough to cause concern (elevated glucose readings)
  - Cognitive overload (“It’s too complicated—too much to bother with.”)
  - Distrust created when patients don’t understand the limits of medical understanding and advice (“I’m not going to listen to her anymore because the medicine she gave me didn’t work.” Or, “He said he didn’t know if it would work.”)

- **NOTE:** These are not arbitrary “beliefs” that can just be replaced; they are failures to comprehend (cognitive errors)
More Examples of Cognitive Hurdles

• Hypertension
  – No outward symptoms
  – So treatment is a nuisance without obvious benefits

• Asthma
  – Symptoms are obvious, but benefits of the superior drug are not
    • Brochodilators give immediate but only temporary relief
    • Inhaled steroids don’t give fast relief but provide better long-term control
3 Ways to Minimize Cognitive Barriers

1. Mobilize person’s abilities
2. Provide cognitive assistance
3. Reduce task complexity
Old Lessons in New Settings

1. Small effects matter; over time, they add up
doing “the small things” right, day after day, minimizes unnecessary illness and injury

2. Individuals have more influence over their development than they realize or exercise
their health depends more on their own behavior than their doctors’; patients need not and should not be passive consumers of care

3. Different genotypes do not experience or utilize the “same” environments in the same way, nor benefit equally from them
patients differ in their ability to understand and adhere to the same treatments. One-size-fits-all information and treatment does not work.

4. Conversely, different genotypes require different environments to thrive
patients who learn slowly and reason poorly will not understand regimens and communications geared to the average patient (or physician!)

5. Environments—jobs—are malleable
cognitive barriers can sometimes be lowered by simplifying/reconfiguring regimens
Thank you.