

# Building Systems of Care for Knowledge Translation

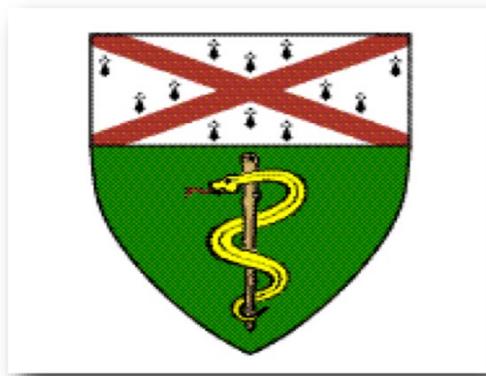
## The Program for Specialized Treatment Early in Psychosis



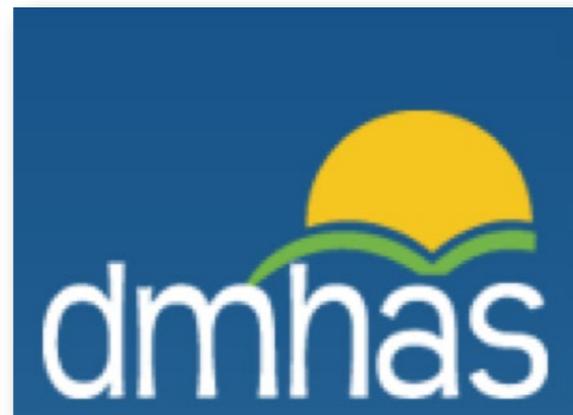
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*DISCLOSURE: I have no personal financial relationships with commercial interests relevant to this presentation.*



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# Secondary Psychosis

*Crude exogenous organic damage of the most varying kind can produce acute psychotic clinical pictures of a basically uniform kind.*

Karl Bonhoeffer, 1909<sup>1</sup>

Traditional categories of secondary psychosis:

Delirium

Dementia

Illnesses of known etiology/pathophysiology (“Medical”)

Substance induced

# Secondary Psychosis

- Many, rare causes
- Limits to screening
- High stakes for (some) missed diagnoses

Epilepsy  
Head trauma (history of) Dementias  
Alzheimer's disease  
Pick's disease  
Lewy body disease  
Stroke (only rarely associated with psychosis)

Psychosis Associated with Medical Diseases

Space-occupying lesions and structural brain abnormalities  
Primary brain tumors Secondary brain metastases Brain abscesses and cysts Tuberos sclerosis  
Midline abnormalities (e.g., corpus callosum agenesis, cavum septi pellucidi) Cerebrovascular malformations (e.g., involving the temporal lobe)  
Hydrocephalus  
Demyelinating diseases  
Multiple sclerosis (not typically associated with psychosis)  
Leukodystrophies (metachromatic leukodystrophy, X-linked adrenoleukodystrophy, Marchiafava-Bignami disease)  
Schilder's disease  
Neuropsychiatric diseases  
Huntington's disease  
Wilson's disease  
Parkinson's disease (not typically associated with psychosis unless treated)  
Familial basal ganglia calcification  
Friedreich's ataxia  
Autoimmune diseases  
Systemic lupus erythematosus Rheumatic fever Paraneoplastic syndrome  
Myasthenia gravis  
Infections  
Viral encephalitis (e.g., herpes simplex, measles [including subacute sclerosing panencephalitis], cytomegalovirus, rubella, Epstein-Barr, varicella) Neurosyphilis  
Neuroborreliosis (Lyme disease) HIV infection or AIDS  
CNS-invasive parasitic infections (e.g., cerebral malaria, toxoplasmosis, neurocysticercosis) Tuberculosis  
Sarcoidosis  
Cryptococcus infection  
Prion diseases (e.g., Creutzfeldt-Jakob disease) Endocrinopathies  
Hypoglycemia Addison's disease Cushing's syndrome  
Hyper- and hypothyroidism Hyper- and hypoparathyroidism Hypopituitarism  
Narcolepsy  
Nutritional deficiencies Magnesium deficiency Vitamin A deficiency Vitamin D deficiency Zinc deficiency  
Niacin deficiency (pellagra)  
Vitamin B<sub>12</sub> deficiency (pernicious anemia)  
Metabolic diseases (partial list)  
Amino acid metabolism (Hartnup disease, homocystinuria, phenylketonuria)  
Porphyrias (acute intermittent porphyria, porphyria variegata, hereditary coproporphyria) GM-2 gangliosidosis  
Fabry's disease  
Niemann-Pick type C disease  
Gaucher's disease, adult type  
Chromosomal abnormalities  
Sex chromosomes (Klinefelter's syndrome, XXX syndrome) Fragile X syndrome  
Velocardiofacial syndrome

Sources: Coleman & Gillberg (1996), Coleman & Gillberg (1997), Goff et al. (2004), and Hyde & Lewis (2003).

# Causes of diagnostic errors

(from Bordage, '99 and Kassirer '89)

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- It never crossed my mind
- I paid too much attention to *one finding*, especially laboratory results
- I didn't *listen* to the patient's story
- I was too much in a hurry
- I *didn't know enough* about the disease
- I let [my supervisor] convince me
- I didn't *reassess* the situation
- The patient had *too many problems* at once
- I was influenced by a *similar case*
- I failed to convince the patient to investigate further
- I was *in denial* of an upsetting diagnosis

# Embracing Bayes

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*“The probability of any event is the ratio between the value at which an expectation depending on the happening of the event ought to be computed, and the value of the thing expected upon its happening.”*

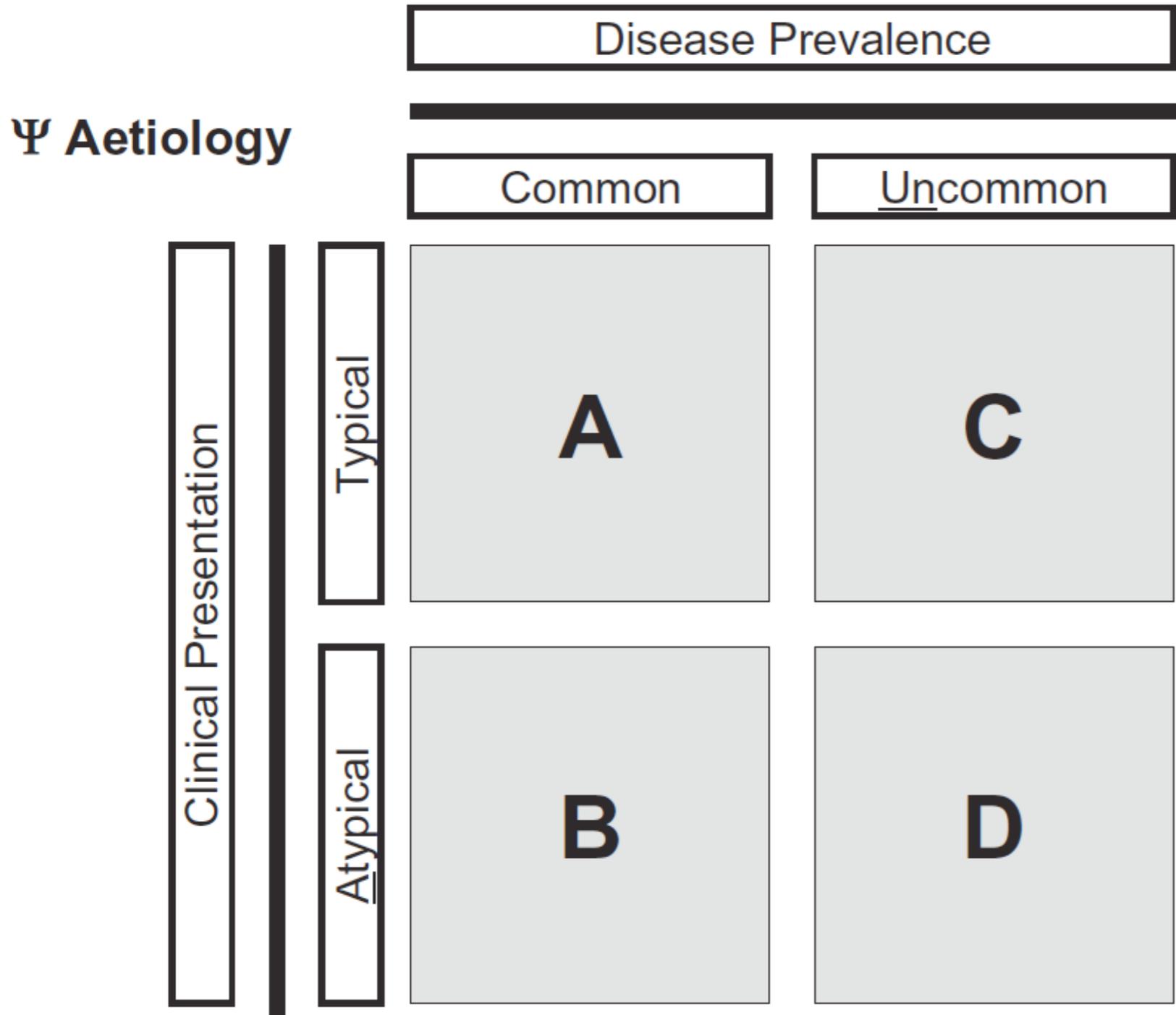
“Bayes theorem is a formalism for learning: that’s what I thought before, this is what I just saw, so here’s what I now think - and I may change my views tomorrow.” (Berry, Stat Med 1993)



Rev Thomas Bayes 1701-1761

Prior probability    ~~Data~~    ~~Posterior Probability~~

# Diagnosing Secondary Psychosis: A Bayesian Quagmire



In the largest prospective cohort, 3% of 268 had secondary etiologies: neurosyphilis, sarcoidosis, lung ca, autoimmune multi-system disease, cerebral sycticersosis, thyrotixicosis

(Johnstone EC, et al. Psychol Med 1987; 17: 371–9)

The choice of test depends on test characteristics AND prevalence of disease

Freudenreich et al. Early Interv Psychiatry 2009; 3:10-18.

TABLE 5. Medical work-up for first-episode psychosis

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Physical exam with emphasis on neurological exam

Vital signs

Weight and height (BMI), waist circumference

ECG (if cardiac risk)

*Laboratory tests*

Broad screening and medical baseline:

CBC

Electrolytes including calcium

Renal function tests (BUN/creatinine)

Liver function tests

Erythrocyte sedimentation rate

Antinuclear antibody

Fasting glucose

Lipid profile

Consider prolactin level

Consider hepatitis C (if risk factors)

Pregnancy test (in women of child-bearing age)

Urine drug screen

Exclude specific treatable disorders:

TSH

FTA-ABS (fluorescent treponemal antibody absorbed)

HIV test

Ceruloplasmin

Vitamin B12

*Neuroimaging*

MRI (preferred over CT)

*Ancillary tests*

Expand aetiological search if indicated, taking into account epidemiology:

For example, CXR, EEG, lumbar puncture, karyotype, heavy metal testing

Expand medical monitoring if indicated:

For example, eye exam (if risk factors for cataracts)

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# Pragmatic 'work-up'

vs. the Quest for Certainty

1. Careful, iterative History and Exam!
2. Test for common disorders, co-morbidities
3. Revisit treatable secondary causes: consider risks/costs of testing but pursue strong suspicions!
4. Test for rare but more easily treatable disorders
5. Establish baseline risk: e.g. cardiovascular, movement disorders, pregnancy testing (and monitor!)

# 2. Diagnostic assessment

## Summary/Principles

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### 1. Take a Bayesian perspective

- ✦ Knowledge of horses and zebras: educated prior probability
- ✦ Critical interpretation of tests (labs, imaging, exams)
  - Tests perform differently at different base prevalence rates

### 2. Probabilistic, revisionist approach (vs. diagnostic certainty)

### 3. Longitudinal f/u + capacity to be surprised

