Routine Outcome Measurement at Waypoint: The Waypoint Index of Clinical Improvement

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Agenda

• Waypoint’s commitment to Evidence Based Practice
• The Clinical Outcome Indicator (Patient’s Current Status)
  – The composite measure and its components
  – Data Quality
  – Validity of the COI
• The Index of Clinical Improvement (Patient’s improvement)
  – Within Ss ANOVA and measure of effect size
  – Validity
  – Routine Outcome Monitor
Waypoint’s Commitment to Evidence Based Practice

• Waypoint Centre for Mental Health Care has made a strong commitment to the provision of mental health care that is **rooted in the best scientific evidence**.

• Waypoint’s Mission Statement is “We are a Catholic hospital committed to providing excellence in specialized mental health and addictions services **grounded in research** and education and guided by faith-based values”

• One of our values, Innovation, states, “We will be creative and **discover and apply new knowledge**”

• The fifth of Waypoint’s five strategic directions is, “**We will advance a research strategy to increase integration of research excellence with clinical services and improve clinical care**”
Waypoint’s Commitment to Evidence Based Practice

• The Strategic Plan for the Research and Academics (R & A) Division, originally developed in 2010 and refreshed in 2012 and 2015 called for establishment of the **Waypoint Research Institute** with the primary purpose of supporting and promoting the transfer of scientific knowledge to Waypoint’s clinical programs. The strategy referred to “integrating research into the fabric of the institution”

• “The research strategy… build(s) on the strengths of the Research and Academics Division and the new Research Institute (to) **increase integration of research excellence with clinical services and improve patient care**”
Professor Archibald Leman Cochrane, CBE FRCP FFCM, (1909 - 1988)

• 1960-69 : David Davies Professor of Tuberculosis and Chest Diseases, Welsh National School of Medicine, Cardiff, Wales.

• 1960-74 : Director, Medical Research Council Epidemiology Research Unit, Cardiff, Wales


“Cardiff University Library, Cochrane Archive, University Hospital Llandough”.
Implementing Outcome Monitoring at the Hospital Level

- Hospitals have examined a number of dimensions of quality of care
- Balanced scorecards are replete with all sorts of measures of corporate performance
- However, the measurement of clinical outcomes has lagged behind
- This presentation describes the development and implementation of a clinical outcome indicator (COI) and a method of routine outcome monitoring (ROM) at Waypoint Centre for Mental Health Care.
Clinical Outcome Indicators: Levels of use

1. Individual practitioner
2. Group practice
3. Treatment program (e.g., group therapy for depression)
4. Hospital program (e.g., forensic program, inpatient unit)
5. Hospital
6. Specialty hospitals
7. Provincial….etc
Desirable Qualities of a Clinical Outcome Indicator

Clinical Requirements
- Reflects the nature and severity of mental illness
- Identifies clinical problems that require treatment/intervention
- Is sensitive to change - reflects real improvements in patient outcomes

Corporate Requirements
- High psychometric qualities (reliability and validity)
- Provides an evaluation of clinical program quality (successes and failures)
- Economical and efficient
- Simple to understand
- Single indicator
RAI-MH in Ontario

• In 2005, the MOHLTC established the Ontario Mental Health Reporting System (OMHRS) to be managed by the Canadian Institute of Health Information (CIHI) and mandated the RAI-MH for use in all MOHLTC funded inpatient psychiatric services in the province of Ontario

• The RAI-MH is completed for each patient provided care in inpatient mental health care facilities in Ontario, at each admission and discharge and quarterly for long stay patients

• Initial completion to be done within 3 days of admission to hospital
Waypoint’s Clinical Outcome Indicator: Core Indicators of Mental Illness

1. Positive Symptoms Scale (PSS)
2. Depression Severity Index (DSI)
3. Cognitive Performance Scale (CPS)
4. Social Withdrawal Scale (SWS)
5. Aggressive Behavior Scale (ABS)
6. Violence Sum (VS)
7. Activities of Daily Living (ADL) Hierarchy Scale
8. Instrumental Activities of Daily Living (IADL) Capacity Scale

Note: These scales have the capacity to change
Calculation of 8 scales and composite

- These 8 scales specified above differed widely in statistical properties (their means, standard deviations and ranges)
- We sought to weight these scales equally
- We transformed the scales as follows:
  - (1) we standardized the scales scores so that each of them had a mean of zero and a standard deviation of 1.00 (transformation to z), and
  - (2) we then transformed the z scores so that each scale had a range of 0.00 to 7.00. The transformation of Z to CCOI followed the equation:
    \[ COI_i = (Z_i + (-1* MIN_z ))*(7/RANGE_z ) \]
- Composite is the sum of the 8 equally weighted 0-7 scales
Correlations between RAI-MH Scale Scores as coded by the clinical team versus blind audit from the clinical record

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<tr>
<th>Scales</th>
<th>Pearson r</th>
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<td>Aggressive Behavior Scale</td>
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<td>Cognitive Performance Scale</td>
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<td>Violence Sum</td>
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<td>Composite</td>
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Waypoint’s 14 Hospital Programs: Mean Scores on COI

Tukey HSD\textsuperscript{a,b}

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Sig. \textsuperscript{c} \textsuperscript{d} \textsuperscript{e} \textsuperscript{f} \textsuperscript{g} \textsuperscript{h} \textsuperscript{i} \textsuperscript{j} \textsuperscript{k} \textsuperscript{l} \textsuperscript{m} \textsuperscript{n} \textsuperscript{o} \textsuperscript{p} \textsuperscript{q} \textsuperscript{r} \textsuperscript{s} \textsuperscript{t} \textsuperscript{u} \textsuperscript{v} \textsuperscript{w} \textsuperscript{x} \textsuperscript{y} \textsuperscript{z}

\textsuperscript{a} Uses Harmonic Mean Sample Size = 91.551.

\textsuperscript{b} The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

\textsuperscript{c} \textsuperscript{d} \textsuperscript{e} \textsuperscript{f} \textsuperscript{g} \textsuperscript{h} \textsuperscript{i} \textsuperscript{j} \textsuperscript{k} \textsuperscript{l} \textsuperscript{m} \textsuperscript{n} \textsuperscript{o} \textsuperscript{p} \textsuperscript{q} \textsuperscript{r} \textsuperscript{s} \textsuperscript{t} \textsuperscript{u} \textsuperscript{v} \textsuperscript{w} \textsuperscript{x} \textsuperscript{y} \textsuperscript{z}
Orthogonal Contrasts

• No SPMI versus SPMI
  – Contrasted an inpatient program at Waypoint comprised of men with Personality Disorders but low levels of serious mental illness with all of the other programs at Waypoint

• Acute versus Chronic
  – Contrasted Waypoint programs with relatively short lengths of stay with programs with long lengths of stay

• Simple Chronic versus Complex Chronic
  – Contrasted chronic programs serving patients with SPMI with chronic programs serving patients with SPMI combined with Dual Diagnosis or Dementia
Orthogonal Contrasts Conducted on 6 successive Fiscal Quarters

• No SPMI versus SPMI
  – Median F = 80.17 (range 59.6 – 103.1), Median df = 363.5 (range 341 – 380)

• Acute versus Chronic
  – Median F = 98.17 (range 84.32 – 142.52), Median df = 363.5 (range 341 – 380)

• Simple Chronic versus Complex Chronic
  – Median F = 113.28 (range 102.9 – 167.5), Median df = 363.5 (range 341 – 380)

• All 18 Fs p<.001
Correlations between GAF score at T2 and the COI Composite Scale and its components (N=342)

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<tr>
<th>COI Composite and Component Scale</th>
<th>Pearson r</th>
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<tr>
<td>Composite</td>
<td>-.635**</td>
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<td>Violence and Aggression</td>
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<td>Functional Impairment</td>
<td>-.684**</td>
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<td>Depression Severity</td>
<td>-.188**</td>
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<td>Positive Symptoms</td>
<td>-.205**</td>
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<td>Social Withdrawal</td>
<td>-.160**</td>
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**p<.01
On Average, discharged patients have lower COI scores than current patients.
Method

• For each Waypoint Clinical Inpatient Program
  – Identified all patients who were current inpatients at the end of the quarter or who had been discharged during the quarter
  – For each patient, we located the RAI-MH completed before the end of the quarter and closest in time to the end of the quarter (RAI-MH at T2)
  – Located the immediately previous RAI-MH (RAI-MH at T1)
• For each RAI-MH we calculated the Clinical Outcome Indicator (COI)
  – The sum of the eight 0-7point scales
For each Waypoint Clinical Inpatient Program

- We conducted a Within Ss Analysis of Variance using the two COIs for each of the N patients in each program
  - Calculated F, statistical significance and effect size
- We conducted these analyses on the data from each quarter in Fiscal 14-15; Fiscal 15-16; and the first two quarters of Fiscal 16-17
Comparing Discharged Patients with Current Patients at T1 and T2

On Average, discharged patients have lower COI scores than current patients.

On average, reductions in scores from T1 to T2 were greater in discharged patients than in current patients.
Georgianwood: An evidence based program for concurrent disorders

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<th>Fiscal</th>
<th>COI-T1</th>
<th>COI-T2</th>
<th>Difference</th>
<th>N</th>
<th>F</th>
<th>Statistically Significant?</th>
<th>Partial Effect</th>
<th>Eta²</th>
<th>Size</th>
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<td>6.21</td>
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Clinical Program: Acute Assessment Program

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<th>Fiscal Year</th>
<th>Mean Clinical Outcome Indicator</th>
<th>ANOVA Statistically Significant?</th>
<th>Partial Effect Size</th>
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<td>Q1</td>
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<td>Q4</td>
<td>4.71 1.85 2.86 83 48.45 Yes 0.371 Large</td>
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The Acute Assessment Program: An evidence based general psychiatry program
Clinical Outcome Indicators: Intervals of use

- Intermittent (periodic program evaluations)
- One time only (research project, clinical trial)
- **Routine (implemented for regular frequent use)**
  - *For inclusion in balanced scorecards*
Waypoint Index of Clinical Improvement (WICI)

- Within SS ANOVA yields Partial Eta Squared
  - Measure of effect size in change from T1 to T2 over all inpatients at Waypoint during Quarter
- Multiply by 100
  - People respond better to integers than proportions to two decimal places
- Reported as 4 quarter moving average, as we have found that the quarterly number varies widely
- So, in the end, the WICI is the effect size in change from T1 to T2 averaged over the 4 quarters during the past year
Waypoint Index of Clinical Improvement (WICI)
Waypoint Index of Clinical Improvement

- Now reported on Waypoint’s Balanced Scorecard
For more information:
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