Global Appraisal of Individual Needs (GAIN) as a Growing Infrastructure to Support Health Services Research and Performance Monitoring

Symposium at the 2011 Addiction Health Services Research conference, Fairfax, VA, October 3-5, 2011
Presentations

1. Overview of the GAIN Infrastructure and the Psychometric Properties of the Instruments
   Michael L. Dennis, Ph.D., Chestnut Health Systems, Normal, IL

2. Using the national GAIN Dataset to support addiction health services research on Adolescent Treatment and Continuing Care,
   Mark D. Godley, Ph.D., Chestnut Health Systems, Normal, IL

3. The GAIN family sweeps across Canada: What are the expectations and impacts for substance abuse and other health and social systems?
   Brian Rush, Ph.D. and Nooshin Khobzi Rotondi, Ph.D., Centre for Addiction and Mental Health, Toronto, ON

4. Discussant
   Wilson M. Compton, III, M.D., National Institute on Drug Abuse (NIDA), Rockville, MD
Overview of the GAIN Infrastructure and the Psychometric Properties of the Instruments

Michael L. Dennis, Ph.D., Chestnut Health Systems, Normal, IL

Symposium at the 2011 Addiction Health Services Research conference, Fairfax, VA, October 3-5, 2011
This presentation will

- Provide a brief overview of the Global Appraisal of Individual Needs (GAIN) instruments, training/certification programs, web applications and data bases.

- A summary of the purpose, content, reports, software, psychometrics and validations done on four core measures:
  - the 5-7 minute GAIN Short Screener,
  - the 25-35 minute GAIN Quick,
  - the 60-120 minute GAIN Initial

- Provide examples on how the GAIN has been used by health services researchers

- End with information on accessing the GAIN data to support secondary analysis.
Global Appraisal of Individual Needs (GAIN) includes…

- A family of instruments ranging from screening to quick assessment to full biopsychosocial and monitoring tools
- Designed to integrate clinical and research assessment
- Designed to support clinical decision making at the individual client level across age & level of care
- Designed to support evaluation and planning at the program level
- Designed to support secondary analyses and comparisons across individuals and programs
GAIN Collaborators in the United States (1993-2011)
There are an additional 1-10 sites in Brazil, China, Mexico, Japan each.
Some Numbers as of September 2011

- 1,717 licensed GAIN administrative units from 48 states, half the provinces of Canada and six other countries
- CSAT has pooled data from 26,390 clients (88% with 1+ follow-up) seen in 182 programs between 1998-2010 and makes it available for secondary analysis
- Currently working on data set of 58,935 that will be the largest in the field when released later this year
- Introduced in 2008, the web-based GAIN ABS software currently serves 587 Agencies with 6,452 users adding over 50,000 records per year
- 22 states, 12 federal agencies, six provinces, and three foundations recognized it as “evidenced based practice” and strongly encourage or mandate its use
- Over 50 researchers have published 190 GAIN-related research publications to date
Progressive Continuum of Measurement
(GAIN & other Common Measures)

- **Screening to Identify Who Needs to be “Assessed” (5-10 min)**
  - Focus on brevity, simplicity for administration & scoring
  - Needs to be adequate for triage and referral
  - GAIN Short Screener for SUD, MH & Crime
  - ASSIST, AUDIT, CAGE, CRAFT, DAST, MAST for SUD
  - SCL, HSCL, BSI, CANS for Mental Health
  - LSI, MAYSI, YLS for Crime

- **Quick Assessment for Targeted Referral (20-30 min)**
  - Assessment of who needs a feedback, brief intervention or referral for more specialized assessment or treatment
  - Needs to be adequate for brief intervention
  - GAIN Quick
  - ADI, ASI, SASSI, T-ASI, MINI

- **Comprehensive Biopsychosocial (1-2 hours)**
  - Used to identify common problems and how they are interrelated
  - Needs to be adequate for diagnosis, treatment planning and placement of common problems
  - GAIN Initial (Clinical Core and Full)
  - CASI, A-CASI, MATE

- **Specialized Assessment (additional time per area)**
  - Additional assessment by a specialist (e.g., psychiatrist, MD, nurse, spe ed) may be needed to rule out a diagnosis or develop a treatment plan or individual education plan
  - CIDI, DISC, KSADS, PDI, SCAN
Expected Factor Structure of Psychopathology and Psychopathy

Source: Dennis, Chan, and Funk (2006)
Screener items were selected using the Rasch Measurement Model


-1.89  -.8  -.32  +.28  +.71

Items around key decision point
Why it is Important to Measure Internalizing and Externalizing Problems Separately

Internalizing Disorders go up with age (and are the focus of adult measures)

Externalizing Disorders go down with age (but do NOT go away)

GAIN Short Screener (GAIN-SS, version 2.1)

- **Administration Time:** A 5-minute screener
- **Purpose:** Used in general populations to
  - identify or rule out clients who will be identified as having any behavioral health disorders on the 60-120 min versions of the GAIN
  - triage area of problem
  - serve as a simple measure of change
  - ease administration and interpretation by staff with minimal training or direct supervision
  - Originally developed for use with web based health risk assessment for several Fortune 500 companies
- **Mode:** Designed for self- or staff administration, with paper and pen, computer, on the web or in local IT application
- **Scales:** Four screeners for Internalizing Disorders, Externalizing Disorders, Substance Disorders, and Crime/Violence Disorders, and a Total Disorder Screener
GAIN Short Screener (continued)

- **Response Set**: Recency of 20 problems rated past month (3), 2-12 months ago (2), more than a year ago (1), never (0)

- **Languages (23)**: American Sign Language, Arabic, Cambodian, English, Farsi, French, Hindi, Indonesian, Japanese, Korean, Laotian, Mandarin (simple & traditional), Marathi, Mongolian, Portuguese, Punjabi, Russian, Somali, Spanish (formal & informal), Tagalog, Vietnamese

- **Interpretation**: Combined by cumulative time period as:
  - Past-month count (3s) to measure change
  - Past-year count (2s or 3s) to predict diagnosis
  - Lifetime count (1s, 2s, or 3s) as a measure of peak severity
  - Can be classified within time period as low (0), moderate (1-2), or high (3)
  - Can also be used to classify remission as early (lifetime but not past month) or sustained (lifetime but not past year)

- **Reports**: Narrative, tabular, and graphical reports built into web-based GAIN ABS or ASP application for local hosting
GAIN SS Psychometrics & Publications

- Excellent Cronbach’s alpha for 20-item total screener (.87 to .92) and fair to good for the 5-item domain screeners (.65-.84)
- Excellent Area Under the Curve (AUC) for Total screener to any disorder (.96-.97) and four domain screeners to respective disorders (.92 to .97)
- Confirmatory factor analysis of the structure demonstrates good fit (CFI=.87) and low residual variance (RMSEA=0.05)
- Substance Disorder Screener had excellent sensitivity (92%) and correct classification (85%) relative to the Diagnostic Inventory Scale for Children (DISC) Predictive Scales
- Internalizing & Externalizing Disorder Screeners had good sensitivity (89-100%) and correct classification (65-75%) relative to the Youth Self-Report
- Excellent screener to respective full GAIN scales (123 items) correlations for total (.94) and good for 4 domain screeners (.84 to .94) for gauging severity and measuring change
- Norms published overall and by age, gender and race
- 30 publications as of 9/30/11
The Total Disorder Screener Also Helps to Predict Level of Care

Residential median = 10.5 (59% at 10+)
(driven by comorbidity)

Outpatient median = 6.0 (30% at 10+)

About 30% of OP clients are in the high severity range more typical of residential

Source: Dennis et al., 2006

Few missed (1/2 - 3%)
GAIN-SS Can Also Be Used for Monitoring

- Track gap between prior and current lifetime problems to identify “underreporting”
- Track progress in reducing current (past-month) symptoms
- Monitor for relapse
GAIN-Quick (GAIN-Q, Version 3.0)

- **Administration Time**: About 20-30 minutes for core (varies depending on severity) and on average 25-45 minutes using full with motivational interview questions (depending on number of problem areas probed)

- **Training Requirements**: 1-day “train the trainer” training plus certification within 1-2 months for Administration certification, and 2 days of motivational intervention training plus 1-3 months for clinical certification

- **Mode**: Generally staff-administered on computer (can be done on paper or self-administered with proctor)

- **Purpose**: Designed for use in targeted populations for more detailed screening, to support brief intervention, or for referral to further assessment or behavioral intervention
GAIN-Quick (continued)

- **Scales:**
  - GAIN-SS scales + similar scales for school, work, physical health, psychosocial stress, and HIV risks
  - Additional “days” items and scale for measuring behavioral change
  - Recency and past-90-day measures of service utilization in each area to aid in placement, track implementation, and estimating quarterly costs to society
  - Reasons for change to support motivational interviewing in each area
  - Quality of Life, Life Satisfaction Scale and interview quality documentation

- **Response Set:** Recency (“the last time” scale), breadth (past-year symptom counts for behavior and lifetime for utilization), and prevalence (past 90 days)
GAIN-Quick (continued)

• Reports:
  • **Validity Report (VR):** Identifying missing/bad data and potentially problematic areas of assessment
  • **Quick Individual Clinical Profile (QICP):** Lab report with graphical and tabular summary with links back to the items
  • **GAIN Quick Recommendation and Referral Summary (QRRS):** Summary narrative for clinician to use for initial assessment summary and treatment planning
  • **Personal Feedback Report (PFR):** Used to support Motivational Interviewing (MI) and Motivational Enhancement Therapy (MET)
  • **Program Profile:** Program-level report that allows comparison of client characteristics, services received, and outcomes between programs, cohorts, or types of clients
Subsumes psychometrics from GAIN SS

- Excellent **Cronbach’s alpha** for 50 item total screener (.90) and fair to good for the 5-7 item domain screeners (.57-.87)

- Quality of life **negatively correlated** with GAIN and TEDS problem counts and **positively correlated** with General Life Satisfaction

- Problem Prevalence Index (measure of functioning) and Quarterly Costs to Society **positively correlated** with GAIN and TEDS problem counts and **negatively correlated** with General Life Satisfaction

- Short screener symptom counts **correlated** with respectively full GAIN scales (.85 to .95) and similarly sensitive to change

- **Norms** published overall and by age, gender and race

- 24 **publications** as of 9/30/2011

- Above available at [www.chestnut.org/li/gain](http://www.chestnut.org/li/gain) and after 1/1/12 at [www.GAINCC.org](http://www.GAINCC.org)
Quarterly Cost to Society

- Using the GAIN we are able estimate the cost to society of tangible services (e.g., health care utilization, days in detention, probation, parole, days of missed school) in 2010 dollars for the 90 days before intake.

- Of the 25,418 clients served in 182 sites between 1998-2010, the average Quarterly Cost to Society per client, in the quarter before they entered treatment, was $4,104 and totaled $95,008,897 across clients.

- In the year before they entered treatment, they cost society an average of $16,416 per client and a total of $380,035,589 across clients.
**Quarterly Cost to Society – 2010 Dollars**

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Cost 2010 dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient hospital day</td>
<td>Days</td>
<td>$1,432.81</td>
</tr>
<tr>
<td>Emergency room visit</td>
<td>Visits</td>
<td>$269.88</td>
</tr>
<tr>
<td>Outpatient clinic/doctor's office visit</td>
<td>Visits</td>
<td>$76.83</td>
</tr>
<tr>
<td>Nights spent in hospital</td>
<td>Nights</td>
<td>$1,432.81</td>
</tr>
<tr>
<td>Times gone to emergency room</td>
<td>Times</td>
<td>$269.88</td>
</tr>
<tr>
<td>Times seen MD in office or clinic</td>
<td>Times</td>
<td>$76.83</td>
</tr>
<tr>
<td>Days bothered by any health problems</td>
<td>Days</td>
<td>$25.63</td>
</tr>
<tr>
<td>Days bothered by psych problems</td>
<td>Days</td>
<td>$9.90</td>
</tr>
<tr>
<td>How many days in detox</td>
<td>Days</td>
<td>$258.99</td>
</tr>
<tr>
<td>Nights in residential for AOD use</td>
<td>Nights</td>
<td>$151.65</td>
</tr>
<tr>
<td>Days in Intensive outpatient program for AOD use</td>
<td>Days</td>
<td>$104.19</td>
</tr>
<tr>
<td>Times did you go to regular outpatient program</td>
<td>Times</td>
<td>$280.70</td>
</tr>
<tr>
<td>Days missed school or training for any reason</td>
<td>Days</td>
<td>$18.38</td>
</tr>
<tr>
<td>How many times arrested</td>
<td>Times</td>
<td>$2,125.81</td>
</tr>
<tr>
<td>Days on probation</td>
<td>Days</td>
<td>$5.77</td>
</tr>
<tr>
<td>Days on parole</td>
<td>Days</td>
<td>$18.59</td>
</tr>
<tr>
<td>Days in jail/prison/detention</td>
<td>Days</td>
<td>$81.06</td>
</tr>
<tr>
<td>Days detention/jail</td>
<td>Days</td>
<td>$113.60</td>
</tr>
</tbody>
</table>

Quarterly Cost to Society

% of Population (23,150)
- 12%
- 41%
- 47%

% of Total Dollars ($95,008,897; mean=$4,104)
- 48%
- 46%
- 6%

Source: CSAT 2010 Summary Analytic Data Set (n=23,150)
GAIN Initial (GAIN-I, Version 5.6)

- **Administration Time:** Core version 60-90 minutes; full version 110-140 minutes (depending on severity)
- **Training Requirements:** 3.5 days (train the trainer) plus recommend formal certification program (Administration certification within 3 months of training; Local Trainer certification within 6 months of training); advanced clinical interpretation recommended for clinical supervisors and lead clinicians
- **Mode:** Generally staff-administered on computer (can be done on paper or self-administered with proctor)
- **Purpose:** Designed to provide a standardized biopsychosocial for people presenting to a substance abuse treatment using DSM-IV for diagnosis and ASAM for placement and needing to meet common requirements (CARF, COA, JCAHO, insurance, CDS/TEDS, Medicaid, CSAT, NIDA) for assessment, diagnosis, placement, treatment planning, accreditation, performance/outcome monitoring, economic analysis, program planning, and supporting referral/communications with other systems
GAIN Initial (continued)

- **Scales**: The GAIN-I has 9 sections (access to care, substance use, physical health, risk and protective behaviors, mental health, recovery environment, legal, vocational, and staff ratings) that include 103 long and short scales, summative indices, and over 3,000 created variables to support clinical decision-making and evaluation. It is also modularized to support customization.

- **Response Set**: Breadth (past-year symptom counts for behavior and lifetime for utilization), recency (48 hours, 3-7 days, 1-4 weeks, 2-3 months, 4-12 months, 1+ years, never), and prevalence (past 90 days); patient and staff ratings

- **Interpretation**:
  - Items can be used individually or to create specific diagnostic or treatment planning statements
  - Items can be summed into scales or indices for each behavior problem or type of service utilization
  - All scales, indices, and selected individual items have interpretative cut points to facilitate clinical interpretation and decision making
GAIN Initial (continued)

- **Reports:**
  - **Validity Report (VR):** Identifying missing/bad data and potentially problematic areas of assessment
  - **Individual Clinical Profile (ICP):** Lab report with graphical and tabular summary with links back to the items
  - **GAIN Recommendation and Referral Summary (GRRS):** Draft of biopsychosocial narrative for clinician to use for initial assessment summary, diagnosis, placement, and treatment planning
  - **Personal Feedback Report (PFR):** Used to support Motivational Interviewing (MI) and Motivational Enhancement Therapy (MET)
  - **Program Profile:** Program-level report that allows comparison of client characteristics, services received, and outcomes between programs, cohorts, or types of clients
GAIN I Psychometrics & Publications

- Subsumes psychometrics for the GAIN SS and Q
- On 68 scales, Cronbach’s alpha of .9 or more on 20, .8-.89 for 29, .7 to .79 for 9 and under .7 for 10
- 8 main scales (including 16 subscales) validated to the Rasch Measurement model and analyzed in terms of different item functioning by gender, race, age and primary substance published (more on the way)
- Confirmatory factor analysis of the structure demonstrates good fit (CFI=.92) and low residual variance (RMSEA=0.06)
- Additional validations to urine, saliva, records, collateral reports, time line follow back and ability to predict future substance use, abuse/dependence problems, emotional problems, HIV risk behaviors and illegal activity
- Norms published overall and by age, gender and race
- 190 publications as of 9/30/11
The more you ask, the more you find: Impact of the Level of Assessment

Source: CSAT 2010 Summary Analytic Data Set  (n = 24,390)
Impact Varies by Clinical Severity

Problem Count by Severity of Victimization

Source: CSAT 2010 Summary Analytic Data Set (n=24,676)

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Problem Count (possible range)</th>
<th>% Increase from Low to High Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAIN SS</td>
<td>0-4 (prob.)</td>
<td>53% increase</td>
</tr>
<tr>
<td>GAIN Q</td>
<td>0-9 (prob.)</td>
<td>60% increase</td>
</tr>
<tr>
<td>GAIN I</td>
<td>0-40 (prob.)</td>
<td>108% increase</td>
</tr>
</tbody>
</table>

Instrument (possible range) and % increase from low to high severity

Source: CSAT 2010 Summary Analytic Data Set (n=24,676)
Any Illegal Activity can be better predicted by using Intake Severity on Crime/Violence and Substance Problem Scales

Intake Crime/Violence Severity Predicts Recidivism

Intake Substance Problem Severity Predicts Recidivism

Knowing both is a better predictor (high–high group is 5.5 times more likely than low low)

While there is risk, most (42–80%) actually do not commit additional crime
“If you build it, they will come…”

Growth of Web-based Data Records

<table>
<thead>
<tr>
<th>Program</th>
<th>Intake</th>
<th>Programs</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969-72 DARP</td>
<td>44,000</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>1979-81 TOPS</td>
<td>11,750</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>1991-93 DATOS</td>
<td>10,010</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>1992-97 NTIES</td>
<td>6,593</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>1993-5 DATOS-A</td>
<td>3,382</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

2008-11 GAIN
- Intake: 71,000
- Programs: 587
- Users: 6,452

1998-2010 CSAT
- Intake: 25,418
- Programs: 182

Cumulative Records

<table>
<thead>
<tr>
<th>Year</th>
<th>GAIN-SS</th>
<th>GAIN-Q</th>
<th>GAIN-I</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY09</td>
<td>534</td>
<td>4,083</td>
<td>10,881</td>
</tr>
<tr>
<td>FY10</td>
<td>4,480</td>
<td>15,984</td>
<td>34,705</td>
</tr>
<tr>
<td>FY11</td>
<td>11,050</td>
<td>43,327</td>
<td>71,013</td>
</tr>
</tbody>
</table>
Process for Accessing GAIN data

- Abstract is developed by lead author and submitted via email to Chestnut via GAINeval@chestnut.org
- Feasibility Review is completed by Chestnut staff and returned to lead author
- Abstract is updated if needed based on the results of the Feasibility Review
- Final Abstract is presented to those from whom permission is sought (e.g., current grantees, project or program directors) and they are asked to ask questions and decide whether to participate within 2 weeks (over 95% due participate)
- Data sharing agreement (DSA) is completed (can be done concurrently with above or in advance)
- A de-identified dataset is provided to the lead author
- Chestnut checks back annually to see if any publications have come out of the process
- For other questions, feel free to contact me or GAINinfo@chestnut.org