Comprehensive Geriatric Assessment in the 21st Century

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Outline

- US Aging Demographics: Geriatric Imperative
- Comprehensive Geriatric Assessment (CGA): history, purposes, benefits
- Geriatric care programs: services, financing
- Future needs / directions
The “Geriatric Imperative”

Increasing Elderly Population

Vast Unmet Healthcare Needs

13% US pop 65+
What is Special About Older Persons?

• Multiple interacting chronic diseases common
• Atypical disease presentation
• Many causes for functional dependency
• Many sources for pain & discomfort
• Diminished reserve capacity
• Special pharmacological considerations
• Slower communication, longer history
Comprehensive Geriatric Assessment

• “The New Technology of Geriatrics”
  --Epstein, Ann Intern Med, 1987

• Definition: “A Multidimensional, interdisciplinary diagnostic process to identify care needs, plan care, and improve outcomes of frail older people.”
Geriatric Assessment: Purposes

- Improve diagnostic accuracy
- Optimize medical treatment
- Improve medical outcomes
- Improve function & quality of life
- Optimize living location
- Minimize unnecessary service use
- Arrange long-term case management
GERIATRIC ASSESSMENT: WHERE?

Hospital
- Special Care Unit
- Consult Team

Nursing Home
- Special Beds
- Admission Protocol

Community
- Office/Clinic
- Home/Visits
CGA: The Hub of the Geriatric Care System

- Hospital
- OPD
- Community
- Rehab or Subacute Unit
- Day Care
- Home Care
- Respite
- Case Mgmt
- Nursing Home
CGA: Measurable Dimensions

- **Physical health**
  - Traditional history, physical exam, lab data, problem list
  - Disease-specific severity indicators
  - Prevention practices (e.g., exercise, asa, vaccination)

- **Functional status**
  - ADL & IADL scales
  - Other functional scales (e.g., mobility, quality of life)

- **Psychological health**
  - Cognitive & affective function scales

- **Socio-environmental parameters**
  - Social networks & supports
  - Economic adequacy
  - Environmental safety & needs
GERIATRIC ASSESSMENT: WHY?

- Much unreported, treatable disease and disability
- Premature nursing home placement
- Neglected rehabilitation
- Excessive drug use/iatrogenesis
- Assessment improves outcomes
Benefits of CGA Programs

- Diagnosis
- Function
- Placement
- Affect
- Cognition

- Medications
- NH Use
- Hospital Use
- Costs
- Mortality
The Sepulveda GEM Study:
Randomized Trial of a Hospital Geriatric Evaluation & Management Unit

↓ Mortality (24% vs 48% at 1 yr)
↓ NH Use (27% vs 47%)
↓ Rehosps (35% vs 50%)
↓ Costs ($22K vs $28K /yr)

↑ ADL (42% vs 24% ↑ at 1 yr)
↑ Morale (42% vs 24% ↑)

Sepulveda Randomized GEU Trial
Mortality Curves, GEU & Control Patients

Proportion died

Months

GEU
Controls
### In-Home CGA & Case Management

**RCT Copenhagen (Br Med J 1984; 289:1522-1524)**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Program (N=285)</th>
<th>Controls (N=287)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Year Mortality</td>
<td>19.6%</td>
<td>26.1%</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>NH Admissions</td>
<td>7 %</td>
<td>10 %</td>
<td>N.S.</td>
</tr>
<tr>
<td>Hospital Admissions</td>
<td>219</td>
<td>271</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Hospital Bed Days</td>
<td>4884</td>
<td>6442</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Emergency Dept. Visits</td>
<td>30</td>
<td>60</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Home Help Provision</td>
<td>16 %</td>
<td>10 %</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Home Modifications</td>
<td>35 %</td>
<td>23 %</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>

"Cost of program more than matched by savings"
## Hospital GEM Programs: Published RCTs

<table>
<thead>
<tr>
<th>Reference</th>
<th>Type/Targ</th>
<th>Significant Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubenstein '84 CA</td>
<td>Ward/++</td>
<td>surv, fct; NH, hosp,$ ★</td>
</tr>
<tr>
<td>Collard '85 MA</td>
<td>Ward/0</td>
<td>surv; LOS, $(1:2) ★</td>
</tr>
<tr>
<td>Allen '86 NC</td>
<td>Cons/0</td>
<td>none</td>
</tr>
<tr>
<td>Hogan '87 Can</td>
<td>Cons/+</td>
<td>surv, cog; drugs ★</td>
</tr>
<tr>
<td>Gilchrist '88 UK</td>
<td>Ward/+</td>
<td>dx, (surv)</td>
</tr>
<tr>
<td>Hogan '90 Can</td>
<td>Cons/+</td>
<td>surv, fct; (hosp) ★</td>
</tr>
<tr>
<td>Applegate '90 TN</td>
<td>Ward/++</td>
<td>fct, (surv); NH ★</td>
</tr>
<tr>
<td>Fretwell '90 RI</td>
<td>Cons/0</td>
<td>affect</td>
</tr>
<tr>
<td>Harris '91 Aus</td>
<td>Ward/0</td>
<td>none</td>
</tr>
<tr>
<td>Thomas '91 NC</td>
<td>Cons/0</td>
<td>surv; readm ★</td>
</tr>
<tr>
<td>Melin '92 Swe</td>
<td>Cons+fu/0</td>
<td>fct; NH, hosp,$★</td>
</tr>
<tr>
<td>Powers '92 TN</td>
<td>Ward/++</td>
<td>fct; NH, LOS, lab, ($)★</td>
</tr>
<tr>
<td>Naughton '94 IL</td>
<td>Cons/+</td>
<td>$, LOS ★</td>
</tr>
<tr>
<td>Naylor '94/9 PA/NY</td>
<td>Cons+fu/0</td>
<td>$, re-adm, hosp★</td>
</tr>
<tr>
<td>Reuben '95 CA</td>
<td>Cons/+</td>
<td>satis, (surv)</td>
</tr>
<tr>
<td>Karppi '95 Fin</td>
<td>Ward/+</td>
<td>fct, satis</td>
</tr>
<tr>
<td>Landefeld '95 OH</td>
<td>Ward/0</td>
<td>fct, NH</td>
</tr>
</tbody>
</table>
## Outpatient GAPs: Published RCTs

<table>
<thead>
<tr>
<th>Reference</th>
<th>Type/f/u</th>
<th>Significant Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tulloch '79 UK</td>
<td>OPD ++</td>
<td>↑dx,fct; ↓hosp</td>
</tr>
<tr>
<td>Hendricksen '84 Den</td>
<td>Home ++</td>
<td>↑surv; ↓hosp, $(NH)$ ★</td>
</tr>
<tr>
<td>Vetter '84 UK</td>
<td>Home ++</td>
<td>↑surv,(affect)★</td>
</tr>
<tr>
<td>Williams '87 NY</td>
<td>OPD 0</td>
<td>↑hosp,$</td>
</tr>
<tr>
<td>Sorensen '88 Den</td>
<td>Home 0</td>
<td>none</td>
</tr>
<tr>
<td>Epstein '90 RI</td>
<td>OPD 0</td>
<td>↑(cog)</td>
</tr>
<tr>
<td>Carpenter '90 UK</td>
<td>Home ++</td>
<td>↑NH,falls★</td>
</tr>
<tr>
<td>Vetter '92 UK</td>
<td>Home ++</td>
<td>↑surv★</td>
</tr>
<tr>
<td>Hansen '92 Den</td>
<td>Home ++</td>
<td>↑(surv); ↓NH,(hosp)★</td>
</tr>
<tr>
<td>Pathy '92 UK</td>
<td>Home +</td>
<td>↑surv,fct; ↓hosp★</td>
</tr>
<tr>
<td>Hall ‘94 Can</td>
<td>Home +</td>
<td>↑home-surv★</td>
</tr>
<tr>
<td>Fabacher ‘94 CA</td>
<td>Home +</td>
<td>↑fct, process</td>
</tr>
<tr>
<td>Stuck ‘95 CA</td>
<td>Home ++</td>
<td>↑fct; ↓NH★</td>
</tr>
<tr>
<td>Melin ‘95 Swe</td>
<td>Home ++</td>
<td>↑fct; ↓NH, hosp, $★</td>
</tr>
<tr>
<td>Engelhardt ‘96 NY</td>
<td>OPD +</td>
<td>↑surv, fct, satis★</td>
</tr>
<tr>
<td>Bernabei ‘98 It</td>
<td>Home ++</td>
<td>↑fct,cog; ↓hosp, $★</td>
</tr>
</tbody>
</table>
IMPACTS FROM GAPs

LOW

- Non-targeted
- Consult only
- No follow-up
- Lower intensity

HIGH

- Well-targeted
- Clinical control
- Follow-up
- Higher intensity
# CGA Program Meta-Analysis

## End-of-Study Summary of Findings

(Stuck et al, Lancet 1993)

<table>
<thead>
<tr>
<th></th>
<th>GEMU</th>
<th>IGCS</th>
<th>HAS</th>
<th>HHAS</th>
<th>OAS</th>
<th>Hosp</th>
<th>Non-hosp</th>
<th>All-CGA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mortality</strong></td>
<td>↓ 25%</td>
<td>NS</td>
<td>↓ 21%</td>
<td>NS</td>
<td>NS</td>
<td>↓19%</td>
<td>↓17%</td>
<td>↓18%</td>
</tr>
<tr>
<td><strong>@ Home</strong></td>
<td>↑ 66%</td>
<td>n.p.</td>
<td>↑ 24%</td>
<td>↑ 49%</td>
<td>NS</td>
<td>n.p.</td>
<td>↑26%</td>
<td>↑25%</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td>↑ 72%</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>n.p.</td>
<td>NS</td>
<td>n.p.</td>
</tr>
<tr>
<td><strong>Cognition</strong></td>
<td>↑100%</td>
<td>↑71%</td>
<td>--</td>
<td>NS</td>
<td>NS</td>
<td>↑79%</td>
<td>NS</td>
<td>↑41%</td>
</tr>
<tr>
<td><strong>Hosp Use</strong></td>
<td>NS</td>
<td>NS</td>
<td>n.p.</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>n.p.</td>
<td>↓12%</td>
</tr>
</tbody>
</table>
Updated Cochrane Meta-analysis: Hospital CGA


- 22 trials, 6 countries, N=10,315
- CGA pts more likely to be alive at home
  - at 6 mos: OR 1.25, 95% CI 1.11-1.42, p=0.002
  - at 12 mos: OR 1.16, 95% CI 1.04-1.28, p=0.003
- CGA pts less likely to be:
  - Institutionalized: OR .79, CI .69-.88, p<.0001
  - Dead or deteriorated: OR .76, CI .64-.90, p=.001
- Subgroup analysis favors inpatient wards
Hospital CGA: Death at Follow-up (OR, 12 mos)

<table>
<thead>
<tr>
<th>Ward</th>
<th>Comprehensive geriatric assessment</th>
<th>Control</th>
<th>Mantel-Haenszel fixed odds ratio (95% CI)</th>
<th>Weight (%)</th>
<th>Mantel-Haenszel fixed odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landolfi 1995</td>
<td>72/327</td>
<td>88/324</td>
<td></td>
<td>21.5</td>
<td>0.76 (0.53 to 1.08)</td>
</tr>
<tr>
<td>Counsell 2000</td>
<td>237/767</td>
<td>269/764</td>
<td></td>
<td>58.0</td>
<td>0.82 (0.66 to 1.02)</td>
</tr>
<tr>
<td>Rubenstein 1984</td>
<td>26/63</td>
<td>36/60</td>
<td></td>
<td>6.7</td>
<td>0.47 (0.23 to 0.96)</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>335/1157</td>
<td>393/1148</td>
<td></td>
<td>86.2</td>
<td>0.78 (0.65 to 0.93)</td>
</tr>
</tbody>
</table>

Test for heterogeneity: $\chi^2 = 2.19$, df = 2, $P = 0.33$, $I^2 = 9$
Test for overall effect: $z = 2.76$, $P = 0.006$

<table>
<thead>
<tr>
<th>Team</th>
<th>Comprehensive geriatric assessment</th>
<th>Control</th>
<th>Mantel-Haenszel fixed odds ratio (95% CI)</th>
<th>Weight (%)</th>
<th>Mantel-Haenszel fixed odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McVey 1989</td>
<td>32/93</td>
<td>40/92</td>
<td></td>
<td>8.2</td>
<td>0.68 (0.38 to 1.24)</td>
</tr>
<tr>
<td>Thomas 1993</td>
<td>17/68</td>
<td>23/64</td>
<td></td>
<td>5.5</td>
<td>0.59 (0.28 to 1.26)</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>49/161</td>
<td>63/156</td>
<td></td>
<td>13.8</td>
<td>0.65 (0.41 to 1.03)</td>
</tr>
</tbody>
</table>

Test for heterogeneity: $\chi^2 = 0.08$, df = 1, $P = 0.78$, $I^2 = 0$
Test for overall effect: $z = 1.84$, $P = 0.07$

<table>
<thead>
<tr>
<th>Total (95% CI)</th>
<th>Comprehensive geriatric assessment</th>
<th>Control</th>
<th>Mantel-Haenszel fixed odds ratio (95% CI)</th>
<th>Weight (%)</th>
<th>Mantel-Haenszel fixed odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>384/1318</td>
<td>456/1304</td>
<td></td>
<td>100.0</td>
<td>0.76 (0.64 to 0.90)</td>
</tr>
</tbody>
</table>

Test for heterogeneity: $\chi^2 = 2.81$, df = 4, $P = 0.59$, $I^2 = 0$
Test for overall effect: $z = 3.24$, $P = 0.001$

Test for subgroup differences: $\chi^2 = 0.54$, df = 1, $P = 0.46$, $I^2 = 0$

Preventive Home Visit Program
Meta-Analysis Summary (Stuck et al, 1999)

- 14 Studies (UK-7, USA-3, DK-3, NL-1)
- All population-based, >65 (most>75)
- Visit staff: RN-5, HV-5, MD-1, SW-1, lay-2
- Effects:
  - ↓Mortality (OR=.88, p<.05)
  - ↓NH admissions (OR=.84, p=.05)
  - ↓Functional decline (OR=.82, p=.11)
Preventive Home Visit Program
Meta-Analysis (2): Covariant Analysis

- ↓ Mortality: Significant only for progs with control deaths >8%/year. \( OR = 0.8 \) vs 1.0
- ↓ NH admission: Significant only for progs with >4 visits. \( OR = 0.8 \) vs 1.0
- ↓ Functional decline: Significant only for progs with CGA. \( OR = 0.4 \) vs 1.1

(Stuck et al, 1999)
Targeting of Geriatric Assessment

(Stuck, Egger, et al., JAMA 2002; 287:1022-8)

Geriatric assessment according to risk groups:

• For dependent/ higher risk older persons: tailored CGA & follow-up programs

• For persons at medium risk/ aged >=75: preventive home visits

• For persons at low risk/ aged >=60: health risk appraisals
Elderly Population Subgroups

- Healthy
- Frail
- Sick
Caring for Elderly Subgroups

Primary Care

Healthy

Geriatrician
Frail

Co-Management

Sick
Screening/Targeting/CGA: System-wide Strategies for Older Persons

- Periodic Screening
- Periodic CGA
- Frail & Hi-risk
- Immediate CGA
- All Old Persons
- Hosp
Does CGA Really Work?: Why have some trials been negative?

- Insufficient sample size
- Inadequate targeting
- Suboptimal outcome measures
- Non-implementation of CGA advice
  - limited resources
  - non-adherence
- Improved control group care
  - academic center, “2nd-opinions”
  - improving geriatric care trends
Thus, CGA programs do improve care processes and outcomes if done well and on appropriate patients.

But CGA needs to be streamlined and costs minimized to enhance widespread use.
Improving Geriatric Assessment Efficiency in the Office

- Target assessment to patient population
- Use self-administered screening forms
- Take advantage of hierarchical measures
- Use observations & key informants
- Multiple visits where feasible/preferable
- Use available office staff as “team”
- Succinct guidelines for common problems
- Printed summaries & instructions

*The “20-minute visit” is possible!*
Screening Instruments: Functional Status

• Basic Activities of Daily Living (Katz) 2-3 min
  - Bathing → Dressing → Getting to toilet
  - Transferring → Continence → Feeding

• Instrumental ADLs (Lawton) 2-3 min
  - Shopping, Telephoning, Preparing meals, Housekeeping, Doing laundry, Finances, Medications, Transportation

• Advanced ADLs 2-3 min
  - Patient-specific higher function (e.g., occupation, recreation, community service, world travel)
Screening & Assessment Instruments

- **Dementia**
  - 3-item recall 1-2 min
  - clock drawing 1-3 min
  - mini-mental state (30-item) 4-10 min

- **Depression**
  - single question <1 min
    - “Do you often feel sad or depressed?”
  - 5-item GDS 1-2 min
  - 15-item GDS 3-5 min
Screening & Assessment Instruments

- **Vision**
  - Screening Question: <1 min
    - “Do you have difficulty with driving, TV, reading, or daily activities because of your eyesight, even while wearing glasses?”
  - Snellen chart (far vision) 1-2 mins
  - Jaeger card (near vision) 1 min

- **Hearing**
  - Whisper test 1 min
    - whisper 3 letters 1 foot from ear (fail if <50% after 3 reps)
  - W-A Audioscope 1-2 mins
    - @40db (fail if unable to hear 1000hz or 2000hz tones)
  - Hearing Handicap Inventory 2 min
Screening & Assessment Instruments

● Malnutrition
  – Screening question: 1 min
    ● “Have you lost 10 lbs in past 6 mos without trying?”
  – BMI (wt in kg/height in meters) 1 min
  – MNA-short form 1-2 min
  – Full MNA 5-9 min

● Mobility
  – Fall question <1 min
    ● “Have you fallen to the ground in the past year?”
  – Timed up-&-go test 1-2 min
    ● Rise from chair, walk 20 ft, turn, walk back to chair, and sit down (fails if >15 secs.)
  – Gait & balance test (Tinetti) 2-3 min
# History of CGA/GEM Programs

<table>
<thead>
<tr>
<th>Period</th>
<th>Early concepts &amp; models</th>
<th>Refinement &amp; testing</th>
<th>Mainstream integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1935-1975</td>
<td>-UK workhouses</td>
<td>-GEM &amp; ACE units</td>
<td>-Improved “usual care”</td>
</tr>
<tr>
<td></td>
<td>-Marjory Warren</td>
<td>-Home visit teams</td>
<td>-Chronic disease</td>
</tr>
<tr>
<td></td>
<td>-AGS/BGS/GSA “philosophies”</td>
<td>-Consult services</td>
<td>management model</td>
</tr>
<tr>
<td>1975-1995</td>
<td>Descriptive papers</td>
<td>Controlled trials</td>
<td>Multi-site trials</td>
</tr>
<tr>
<td></td>
<td>UK NHS</td>
<td>Meta-analyses</td>
<td>Add’l meta-analyses</td>
</tr>
<tr>
<td></td>
<td>VA GRECCs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995-2015</td>
<td>Uniform CGA databases</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(e.g., MDS, RAI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capitation / managed care</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What works?

• Hospital:
  - GEM units ++
  - Gero-rehab/ortho ++
  - ACE units +
• Home-visit CGA & f/u ++

What doesn’t work?

• Hospital:
  - Consult teams alone
• Outpatient:
  - Screening alone
  - CGA alone
Newer Geriatric Care Models

- ACE Units → ↑ fct, ↑ home at f/u (Baztan, BMJ 2009)
- Geriatric EDs
- Ortho-geriatric programs
- Pre-operative CGA
- Interface geri (p short hosp) → NS (Conroy, Age Ageing 2011)
- Post-acute care f/u programs
- Geriatrics in ACOs (accountable care orgs)
Reorganization of Care in US Healthcare Reform

1° Care MDs
Spec MDs
Outpt Hosp Care
Inpt Hosp Care

Acute Care Bundling

Medical Home

Acute care episode w/ Post Acute Bundling

Post-Acute Bundling

LTACs
Inpt Rehab

SNFs
HHC, Hospice, Pall Care

Accountable Care Organizations
The US Healthcare System

**ADVANTAGES**
- Good resources
- High technology
- Active research
- Choice of provider
- Provider flexibility
- Relatively high provider income

**DISADVANTAGES**
- Too expensive
- Too high-tech
- Duplication & inefficiency
- Inequality
- Coverage gaps
- Non-planned
CGA: Remaining Questions

- What is are most effective CGA models?
- Which outcome can CGA most improve?
- What are key program elements?
- Who benefits most? (Targeting criteria?)
- How can we make CGA most cost effective?
- How best to integrate CGA into care system?
- Will CGA benefits decrease as “standard” care for older persons improves?
Modeling elder healthcare through Education, Service & Research
Donald W. Reynolds Department of Geriatric Medicine: Brief History

• Initiated in 1997 at VAMC

• Rapid growth after initial DW Reynolds grant in 1999
  – Initial mission: “to provide premier education for future geriatric leaders & providers, outstanding service to seniors & cutting edge aging research”
  – One of only 6 full departments of geriatric medicine

• Currently >60 FTEE, actively involved in education, research and clinical care

• Vision—to build a state-wide system of geriatric clinical and educational excellence emanating from OUHSC grounded in an outstanding research program w/ global reputation & collaborations
Donald W. Reynolds Department of Geriatric Medicine: Components

- **Education**
  - Medical (students, residents, fellows, CME)
  - Allied health (nursing, pharmacy, rehab, et al)
  - Community outreach (OHAI)
- **Clinical care**
  - Hospital, outpatient, NH, home care
- **Research**
  - Basic – ROCA
  - Translational, applied clinical, health services
Extra slides....
Preventive CGA visits for home-living elders: Half full or half empty?

Systematic analysis Haastregt et al. (BMJ 2000): discrepancies: “no evidence”

Meta-Analysis Elkan et al. (BMJ 2001): pooled effect highly significant: “high level of evidence”

Systematic analysis of 18 trials with meta-regression analyses

Hypothesized co-variates influencing outcomes:

- targeting independent older persons (EIGER study)
- long-term intervention follow-up (Lancet meta-analysis)
- use of intense multidimensional CGA

Stuck, Egger, et al., JAMA 2002; 287:1022-8
Risk of nursing home admission

0 to 4 follow up visits

- Sørensen (1988)
- Heberty (2001)
- Newbury (2001)
- Vetter (1992)
- van Haastregt (2000)

Overall (95% CI): 1.05 (0.85 to 1.30)

5 to < 9 follow up visits

- Stuck (2000)
- Tinetti (1994)
- Carpenter (1990)

Overall (95% CI): 0.90 (0.75 to 1.07)

> 9 follow up visits

- Pathy (1992)
- Hendriksen (1984)
- van Rossum (1993)
- Stuck (1995)

Overall (95% CI): 0.66 (0.48 to 0.92)

Risk ratio

Stuck et al., JAMA 2002
Risk of functional status decline

No multidimensional assessment and follow up
- Sørensen (1988)
- Carpenter (1990)
- McEwan (1990)
- Vetter (1992)
- Clarke (1992)
- Pathy (1992)
- van Rossum (1993)
- Newbury (2001)
- Overall (95% CI) 1.01 (0.92 to 1.11)

Multidimensional assessment and follow up
- Fabacher (1994)
- Tinetti (1994)
- Stuck (1995)
- Stuck (2000)
- van Haastregt (2000)
- Hebert (2001)
- Overall (95% CI) 0.76 (0.64 to 0.91)

Figure 3, Stuck et al., JAMA 2002
New studies published after meta-analyses: example 1


11 VA centers with established geriatric assessment programs

Frail hosp older persons, patients of geriatric program excluded

RCT w/ cross-over factorial design/ 1-yr follow-up

UCIP-UCOP (N=348)
UCIP-GEMC (N=346)
GEMU-UCOP (N=348)
GEMU-GEMC (N=346)
Results at one-year follow-up
(Cohen 2002; Schmader 2004; Phibbs 2006)

**Survival:**
- UCIP-UCOP 78.7%
- UCIP-GEMC 78.9% n.s.
- GEMU-UCOP 78.7% n.s.
- GEMU-GEMC 77.2% n.s.

**Significant effects:**
- GEMU: ↑ ADL; ↓ NH adm & days; ↑ Rx qual
- GEMC: ↑ mental health; ↓ drug reactions
Limitations of the Cohen trial:

» Factorial crossover design (possible effect on process—team did not know if they would be following their patients)

» All sites with established high-quality geriatric care programs (control care better than usual)

» Central control may have affected local team processes (more complex than co-op drug studies)
New studies published after meta-analyses: example 2

- Saltvedt et al, Reduced mortality in treating acutely sick, frail older pts in a GEM unit. *JAGS* 2002 50:792-8. (Norwegian RCT)
- Acute pts >75 randomized to GEMU or general medicine wards in Univ of Trondheim Hosp
- Mortality:
  - GEMU: 12% 27% 12%
  - GIM: 27% .004 6 mo 16%
  - 29% .02 12 mo 28% 34% .06
- No data reported on other outcomes
CGA is effective in improving many important outcomes, BUT...

How can it be made more practical or streamlined to fit better within today's medical reality?
Increasing CGA in Today's Reality

Proposals

- Multi-level targeting: screening → casefinding → CGA
- Streamlined CGA approach
- Recapturing cost savings
- Integrated follow-up/case-management system
Geriatric Ambulatory Care: Keys to Success

- Comprehensive assessment
- Interdisciplinary team approach
- Provider continuity
- Case management & follow-up
- Home support system: phone contacts, meals-on-wheels, home visits, etc.
- Enthusiasm
Hospital GEM Units: Types

- **Acute care units:**
  - most costly & intensive, handles “outliers”, MD or RN run

- **Subacute care units:**
  - longer LOS, team care, CGA & rehab

- **Rehabilitation units:**
  - stroke, orthopedic, or general rehab

- **Mixed units:**
  - efficient space use, swing beds, issues of identity & balance
Advantages of the Home Visit for Geriatric Assessment

- Observation of function at home
- Observe environment: access, safety
- Nutritional adequacy
- Medication inventory
- Social supports & interactions
- Elder abuse risks
- Needs for adaptive equipment
- Homemaker needs
Key Observations During the Home Visit: Examples

- Garden: well tended?
- Entries/exits: accessible?
- Refrigerator: food quantity & quality
- Medicines: polypharmacy? current?
- Safety: water temp? smoke alarm? floor hazards (cords, rugs, clutter)? rails (bathroom, stairways)?
- General: temperature/insulation? cleanliness? lighting?
U.S. Population Growth

SOURCES: CDC/NCHS, Health, United States, 2008, Figure 1. Data from the U.S. Census Bureau.
The I’s of Geriatrics

Instability (falls)
Incontinence
Intellectual impairment (dementia)
Iatrogenesis (polypharmacy)
Incoherence (delirium)
Insulin resistance (diabetes)
Immobility
Irritability (depression)
Inanition (malnutrition, frailty)
Impoverishment
The whole world is aging

Percent of Population Aged 65 & Over: History and UN Projection

- Developed World
- Developing World

1950: 8%, 4%
1970: 9%, 4%
1990: 10%, 4%
2000: 12%, 4%
2010: 13%, 5%
2020: 14%, 6%
2030: 16%, 8%
2050: 23%, 10%

Source: UN (2005)
Life spans in developed countries have risen dramatically.

Source: UN (2005)
Death rates for selected leading causes of death among people age 65 and over, 1981–2006

Per 100,000


ICD-10

Diseases of heart

Malignant neoplasms

Influenza and pneumonia

Chronic lower respiratory diseases

Cerebrovascular diseases

Diabetes mellitus

Alzheimer’s disease

NOTE: Death rates for 1981–1998 are based on the 9th revision of the International Classification of Diseases (ICD-9). Starting in 1999, death rates are based on ICD-10 and trends in death rates for some causes may be affected by this change. For the period 1981–1998, causes were coded using ICD-9 codes that are most nearly comparable with the 113 cause list for the ICD-10 and may differ from previously published estimates. Rates are age adjusted using the 2000 standard population.

Reference population: These data refer to the resident population.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.
Modifiable Causes of US Deaths – 2000: 44% of All Deaths

Hospital Use Increases with Age

Annual US Hospital Discharges per 100 persons, 1991

Data from: Health United States, 1992, USPHS
Hospital Discharge Locations

% of Discharges by Age, Males 1987 US Data (NCHS, 1993)
Physician Visits ↑ with Age
Mean no./yr., 2003-4 (NCHS. 2006)
Health Service $ ↑ with Age
Per capita expenditures, in $1000s, 1987 US Data (NCHS 1993)
**Health Care Expenditures**

**Major components of health care costs among Medicare enrollees age 65 and over, 1992 and 2006**

<table>
<thead>
<tr>
<th>Component</th>
<th>1992</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient hospital</td>
<td>32%</td>
<td>25%</td>
</tr>
<tr>
<td>Physician/outpatient hospital</td>
<td>32%</td>
<td>35%</td>
</tr>
<tr>
<td>Long-term care facility</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td>Home health care</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Prescription drugs</td>
<td>4%</td>
<td>16%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
<td>9%</td>
</tr>
</tbody>
</table>

**NOTE:** Data include both out-of-pocket costs and costs covered by insurance. “Other” includes short-term institutions, hospice services, and dental care. Reference population: These data refer to Medicare enrollees. **SOURCE:** Centers for Medicare and Medicaid Services, Medicare Current Beneficiary Survey.
Functional Limitations

Percentage of Medicare enrollees age 65 and over who have limitations in activities of daily living (ADLs) or instrumental activities of daily living (IADLs), or who are in a facility, selected years 1992–2005

**ADL:**
- Bathing, dressing, eating, transferring, walking, toileting.

**IADL:**
- Telephone, housework, meal prep, shopping, managing money

Reference: These data refer to Medicare enrollees.
Source: Centers for Medicare and Medicaid Services, Medicare Current Beneficiary Survey.
Per Capita Health Spending in 2006

Source: McKinsey Global Institute and NEJM 2009
Percent Health Care of GDP 2006

- US: 15.3%
- France: 11.1%
- Germany: 10.4%
- Canada: 10.0%
- England: 8.4%

data from WHO http://www.who.int/en/
Why is US Healthcare So Costly?

- Technology emphasis
- Higher prices and wages
- Price insensitivity & supply-driven incentives ("fee for service")
- Values/culture
- Supplemental insurance
- Inefficiency & lack of care coordination
- Poor lifestyle choices
- Fear of litigation ("defensive medicine")
Geriatrics: Founders & Leaders
Number of Geriatricians

Cumulative Certificates awarded
Currently Certified Geriatricians

Save the Date
July 23-27, 2017
Moscone Center
San Francisco, California

“Global Aging and Health: Bridging Science, Policy, and Practice”

Web site launches June 2013
Visit  iagg2017.org  and sign up to receive future IAGG2017 news
## Brief Timeline of US Geriatrics

### Early Days
- **1909** Dr. Nascher coins term “geriatrics”, 1914 publishes first text
- **1930s** British take lead in developing field, Marjory Warren describes her successes in chronic hospitals
- **1939** GSA, 1942 AGS, 1946 J Gerontology, 1953 JAGS, 1964 Medicare

### Developmental Phase
- **1980s** Recognition of geriatric syndromes & CGA
- **1988** Geriatrics Board Certification

### Current Scene
- **7200 Certified Geriatricians**—too few,
- **Universal health insurance (Medicare), LTC: NH, homecare, daycare**
- **New Rx benefit, Hospice coverage, Prevention benefits, PACE programs**
Newer Meta-analysis: Hosp CGA Programs
(Ellis & Langhorne Brit Med Bull 2005; 71:45)

- ↑ # hospital CGA RCTs (13 → 20)
  - 10 GEMU, 10 IGCS
- End-of-study mortality became NS
  - OR = 0.95 (95% CI 0.87-1.05, n=10,427)
- Living at home:
  - GEMU: 1.80 (1.3-2.5), 1.68 (1.2-2.4)
  - GEMU + IGCS: 1.26 (1.04-1.5), 1.47 (1.1-1.9)
  - 4 extra pts alive & at home per 100 treated (95% CI: 1-7)
- No new data on ↑ function & ↑ cognition