CHART-DEL
Training Guide to a Chart-based Delirium
Identification Instrument

The CHART-DEL (Chart-based Delirium Identification Instrument) is a validated method that can be used to review charts (medical records) to detect the presence of delirium. This document will explain how to use CHART-DEL in both research and clinical settings. In addition, this document will provide some background on delirium and how this tool evolved over time.

Training Manual Citation: Xu G, Fong TG, Yee J, Inouye SK. Delirium Identification: A training guide to a chart-based delirium instrument. 2011; Hebrew Rehabilitation Center, Boston, MA.

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Introduction

Delirium, characterized as an acute decline of attention and cognition, is not only a widespread and serious problem for hospitalized older patients, but also one of the most common preventable adverse events. It is often iatrogenic, with contributions from many aspects of hospital care, including adverse drug reactions, complications of procedures, and immobilization.

Accurate methods of identifying delirium have relied on expensive and time-intensive bedside assessments including cognitive assessments at frequent intervals. Although such methods are appropriate for clinical care, a method based solely on chart review would simplify the process and markedly improve the feasibility of delirium detection on a wider scale. A chart-based method for identification of delirium would make it possible to address delirium in broad-based clinical, quality-improvement, and research initiatives.

This chart-based method (CHART-DEL) was developed and validated to allow for extraction of presence of delirium based on information available in the medical record. In a prospective validation study of 919 older hospitalized patients, it was found that the sensitivity of the chart-based instrument was 74%, specificity was 83%, and likelihood ratio for a positive result was 4.4. Overall agreement between chart and interviewer ratings was 82%.[1] In another study, eight specific key words were identified as showing positive predictive values (PPVs) of 60-100% for diagnosis of delirium.[2]

When possible, Delirium Identification by CHART-DEL validated chart review should be paired with a clinical interview to serve as a diagnostic gold standard, as recommended by Saczynski 2014.[2]

Please refer to these background articles for further information:

[1]Inouye SK, Leo-Summers L, Zhang Y, Bogardus ST, Leslie DL, Agostini JV. A chart-based method for identification of delirium: validation compared with interviewer ratings using the Confusion Assessment Method. *J Am Geriatr Soc.* 2005:53:312-318

[2]Saczynski JS, Kosar CM, Xu G, Puelle MR, Schmitt E, Jones RN, Marcantonio ER, Wong B, Isaza I, Inouye SK. A Tale of Two Methods: Chart and Interview Methods for Identifying Delirium. *J Am Geriatr Soc.* 2014; 62:518-524. PMC3959564

Delirium Identification:
General Instructions

1)   Obtain subject's baseline or preexisting mental status information from the chart:

In order to identify any NEW or ACUTE change of mental status in the chart, it is important for raters to review the information on the patient's baseline (pre-existing) mental status.

Some patients may already have baseline mental status changes due to neurodegenerative diseases, substance abuse, or medication side effects prior to their admission. Although mild to moderate mental status changes are not always recorded clearly in the diagnoses or notes, it is still possible to find the nature of those changes in the related notes prior to the target admission/surgery, such as onset, duration, intermittent or continuous process, prior delirium, previous dementia treatments, etc.

We recommend using the following sources to obtain baseline mental status information:
-Previous discharge summaries
-Out-patient office visit notes (primary care, neurology, and psychiatry)
-Pre-op Anesthesia evaluation notes
-Pre-admission medication list

These notes are especially valuable within 6 months prior to the target hospital admission or surgery.

2)   High-yield sections in the chart used to identify delirium

Once the baseline mental status is identified, the next step is to find whether any change in baseline mental status has been recorded in the chart. It is essential to review the entire chart, including any electronic or written/scanned forms. Because these charts tend to be quite dense, it may be difficult to sort out all of the relevant information. We recommend identifying the delirium first and then collecting all of the details related to it.

The following represent the most common sections of the chart used to identify delirium:
-Nurse notes (admission notes, daily notes)
-Progress notes (by either physician or nurse)
-Neurology or Psychiatric Consultant notes
-Physical therapy notes
-Social work notes
-Discharge summary

3)   Trigger Words or Phrases

It is important to be familiar with the glossary of terms used to identify delirium. Please refer to Appendix II for a list of the most common trigger words/phrases.

4)   Recording multiple episodes of delirium

Some patients may have multiple episodes of delirium during the same hospitalization. We recommend recording these episodes individually and in chronological order as seen in question #4 of the questionnaire (Appendix I).

5)   Strategies to maximize useful information and avoid bias

In addition to didactic training and practice chart abstractions with expert inter-rater reliability (see Recommended Training Procedure, Pg. 9), new raters are encouraged to become familiarized with the medical record system of the institution and medical abbreviations commonly used in the medical chart. Medical record trainings are commonly offered at hospitals for general information about chart review and medical terminology.

We also recommend recording "delirium-related" information/notes found in the charts word-for-word into the CHART-DEL instrument without clinical interpretation or judgment. Record information with as much detail as possible, as the chart abstraction may be used in the future for adjudication by an expert panel (see Scoring and Adjudication Guidelines, Pg. 8).

Item by Item Instructions

Below is an item by item description on how to properly abstract the CHART-DEL information requested in the questionnaire (Appendix I).

Review entire medical record, including progress notes, nursing notes, consultations, and all relevant sections of the chart for this hospitalization. Remember that all of the 'Uncertain' answers will be adjudicated based on the information you record. Thus, it is important to record legible notes.

1. Is there any evidence in the chart of acute confusion (e.g., delirium, mental status change, disorientation, hallucinations, agitation, etc.)?
Review the entire medical record, including progress notes, nursing notes, consult notes, etc. IMPORTANT: Consult the Appendix II list at the end of these protocols. Remember, we are looking for any acute change.

2. What is the source of information about the first episode of acute confusion?
If source is other than nurse or physicians' notes, be sure to specify clearly.

3. Approximate time of onset of first episode of acute confusion.
Check nurse's notes, progress notes, orders, laboratories, etc. for the earliest time recorded referent to the event. It is necessary to find documentation of acute confusion symptoms in order to record this as the date/time of onset.

4. Describe each reference to acute confusion in the chart, verbatim:
This is a verbatim description of confusion episodes during the hospitalization. Use the reverse side of the pages as needed. Please record the date, time (am, pm, or unknown) and source (MD, attending, RN, PT, etc.) for each entry.

[NOTE: The first reference should include the details of what was filled out on question #1 of this section. Entries should reflect substantiation of delirium (acute/fluctuation, inattention, disorganized thinking, altered consciousness) and indicate a timeline. Record the wording verbatim from the chart (avoid interpretation). It is possible that there will not be a daily documentation related to acute confusion. Stop entering if there are 24 + hours of NO delirium and no later entries substantiating delirium.]

5. What was the total duration (in days) of confusion (i.e., as determined by all references to confusion in the chart)? Start the count of days with the date of first documentation of acute confusion or delirium symptoms.
NOTE: COUNT FIRST DAY THROUGH LAST DAY OF DELIRIUM SYMPTOMS. DO NOT COUNT TIME AFTER DISCHARGE.

6. Was there any evidence of agitation associated with the delirium (i.e., hyperactive delirium)?

Look for evidence of agitated or hyperactive behaviors in the chart (see sample words in Appendix II). However, it is important to note that these words alone would not necessarily indicate delirium; other supporting evidence of _acute change, inattention, altered level of consciousness, or acute confusion_ would be required.

7. Was there any evidence of reversibility or improvement of acute confusion during the hospitalization?

Reversibility or improvement of symptoms during the course of hospitalization is an important supporting feature for delirium. Look for indications from nursing or physician notes of "improvement" or "resolution" of symptoms. Other examples: signs that patient has gone from Ox1 to Ox3, improvements in cognitive testing scores, or total clearing of hyperactive or agitated symptoms.

Scoring and Adjudication Guidelines

The most accurate diagnosis of delirium uses a combinataion of chart-review identification plus clinical interview (Saczynski 2014). However, it is possible to classify the chart-review diagnosis into "Definite", "Probable", "Possible", or "Uncertain" delirium by using the following adjudication procedure. We advise that this adjudication be done by at least 2 or more delirium experts reviewing the CHART-DEL information with a consensus-building process.

Rate delirium according to the assessment of the level of probability that delirium is truly present. Some examples of how to score this are provided below.

1. **Definite** (85%+): diagnosis is unequivocal; confirmed diagnosis made by an experienced reference standard rater (i.e., attending neurologist, geriatrician, psychiatrist)

2. **Probable** (60-85%):
   a. All Confusion Assessment Method (CAM) features are present in the notes (i.e., all four of these features are present: (1) acute onset/fluctuation; (2) inattention; (3) disorganized thinking or (4) altered level of consciousness).
   b. Acute onset of disorientation or hallucinations, especially with evidence of reversibility or evidence of attribution to medications (in someone with no history of preexisting cognitive impairment).

3. **Possible** (40-60%):
   a. Not all CAM features are present, but at least 2 or more, plus other supporting features (such as presence of agitation or inappropriate behavior)

4. **Uncertain** (10-40%):
   a. Cases where nurses wrote things like "patient confused after Dilaudid, now sleeping comfortably", but nothing else--no description, no details about the confusion, and the next day no further comment.

5. **No evidence** (<10%): In general, the overarching principle is that the behavior needs to be well outside the range of normal elderly behavior. So, for instance, a report of transient episode of disorientation upon awakening from a nap would not be considered abnormal. Also, inappropriate behavior again needs to be taken into context--an older woman trying to climb out of bed in the face of urinary urgency (and nurses maybe not answering call lights quickly) may not be behaving truly inappropriately despite what the nurses call it. If this is the ONLY symptom, would not be sufficient evidence for delirium. Forgetfulness or sleepiness as isolated symptoms are not sufficient.

Recommended Training Procedure

We recommend the following procedure to train research, quality improvement, or reference standard clinical staff on the use of CHART-DEL as follows:

1. Review this manual and didactic material with a delirium expert.

2. Complete at least 10 chart abstractions with an expert rater. Upon completion of the abstractions, go through each item together in order to gather inter-rater reliability data. Ensure that the charts being abstracted include at least 5 patients with delirium and 5 without delirium.

3. Once a high rate of inter-rater reliability has been achieved with parallel ratings, complete 10 charts independently and then compare the abstraction with the expert ratings (these abstractions should have been previously completed by an expert rater for this specific use).

4. Proceed with independent ratings.

5. It is recommended that periodic inter-rater reliability assessments be completed with all raters on a quarterly or biannual basis.

6. Any cases or ratings that are uncertain should be adjudicated by an expert panel based on all the information on the form (see procedure on Pg. 9).

For clinical purposes: To obtain accurate and reproducible results, we recommend a similar procedure, teaming an experienced user with a new user or a group education session conducted by a delirium expert.

Requirements for Use

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The CHART-DEL should be used in accordance with training and procedures outlined in the CHART-DEL Training Guide. . In order to use the CAM in any research you must submit a request to our office by emailing Deena Sandos at dsandos@americangeriatrics.org and await approval.

Translations
If you would like to translate the CHART-DEL, please email Deena Sandos at dsandos@americangeriatrics.org for guidance through this process. Include what language you would like to translate the CHART-DEL to.

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3.Training Videos: The reproduction of the CHART-DEL in training videos is prohibited.
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Appendix I: CHART-DEL Questionnaire:
Chart Abstraction for Delirium During Hospitalization

	Circle answer
1. Is there any evidence in the chart of acute confusion (e.g., delirium, mental status change, disorientation, hallucinations, agitation, etc.)? Review entire medical record, including progress notes, nursing notes, consult notes, etc.	Yes No Uncertain
2. What is the source of information about the <u>first</u> episode of acute confusion?	Nurse's notes Physician's progress notes Other (specify):_____ Uncertain
3. Approximate time of onset of first episode of acute confusion? Check nurse's notes, progress notes, orders, laboratories, for earliest time recorded referable to the event.	Date: ___ ___ / ___ ___ / ___ ___ Month Day Year . Time: ___ ___ : ___ ___ am pm Uncertain

4. Describe each reference to acute confusion in the chart, verbatim:

Date (mo/day/yr)	Time (am, pm)	Source	Description (verbatim, in detail)

Date (mo/day/yr)	Time (am, pm)	Source	Description (verbatim, in detail)

	Circle answer
5. What was the total duration (in days) of confusion (i.e., as determined by all references to confusion in chart)	Days Uncertain
6. Was there any evidence of agitation associated with the delirium (ie, hyperactive delirium?) If yes, please describe:	Yes No Uncertain

7. Was there any evidence of reversibility or improvement of acute confusion during the hospitalization? If yes, please describe:	Yes No Uncertain
Delirium Present:	Yes No

Appendix II: Trigger Words and Phrases for Delirium Identification

a) Diagnosis synonymous with Delirium

- Acute brain syndrome
- Acute brain failure
- Acute cerebral insufficiency
- Acute organic psychosis
- Acute organic brain syndrome
- ICU Psychosis
- Metabolic encephalopathy
- Pseudosenility
- Reversible dementia
- Toxic-metabolic encephalopathy
- Toxic psychosis

b) Trigger Words *(associated with high positive predictive value for delirium)

- Acute confusion
- Acute
- Acute mental status change (MS Δ)
- Altered mental status (AMS)
- Alert and Oriented <3
  i.e. "A+O x1", or "A+O x2"
- Confus*
- Disorient*
- Deliri*
- Encephalopathy
- Hallucinating
- Hallucinations
- Mental status change
- Reorient*

Words annotated with an* indicate multiple different endings, such as '-um', '-ous', etc.

c) Supporting Words and Phrases

- Agitat*
- Alarm
- Anxious' or 'Anxiety
- Attent*
- Combative
- Commands
- Delusion
- Distract*
- Fall
- Fluctu*
- Forget*
- Hypoactive
- Illusion
- Impuls*
- Letharg*
- Multifactorial
- Not Cooperative
- Non-responsiveness
- Narcotic*
- Out of Bed or 'OOB'
- Redirected
- Refus*
- Restless
- Sedat*
- Sleepy
- Somnolent
- Unrespons*
- Uncooperative
- Resist*
- Inappropriate
- Altered level of consciousness
- Diminished level of responsiveness
- Difficulty with arousal
- New onset coma, stupor, lethargy or somnolence
- Obtunded

- Inappropriate behavior, such as climbing over bedrails, violence with staff
- Excessive pain management with little or no effect
- Any citation of patient's words and sentences indicating confusion

d) Look for these terms and explore whether there has been a change from previous level

- Agitation
- Delusions
- Disorientation
- Inappropriate or disruptive behavior O X 1 (oriented X 1), O X 2 (if change from previous)
- Hallucinations
- Paranoid ideation

e) Examples of Agitated behaviors (must have other supporting signs or symptoms to categorize as delirium):

- Kicking
- Biting
- Spitting
- Shouting
- Screaming
- Swearing
- Yelling
- Disrobing in public areas
- Pinching
- Punching
- Hitting
- Pulling out tubes (nasogastric, intravenous, etc.)
- Breaking or pulling out heparin lock
- Climbing out of bed, or over the side rails

Identification of trigger word(s) or phrases in the chart should alert the rater to look further into that section of the chart for details of delirium:

Please note that some common expressions found in notes related to delirium include: "forgetful", "very sleepy" or "knowledge deficit." It is important to note that these terms/words are not sufficient alone for identifying delirium unless they are accompanied with other terms found in the glossary **or** other evidence of delirium.