HbA1c assesses blood glucose control over the previous 120 days, future studies should include longer intervention and monitoring periods and more-detailed assessment of possible mechanisms of action of methylphenidate, including its effects on prescribed diet, medication and exercise regimen adherence, and glucose metabolism and insulin resistance.

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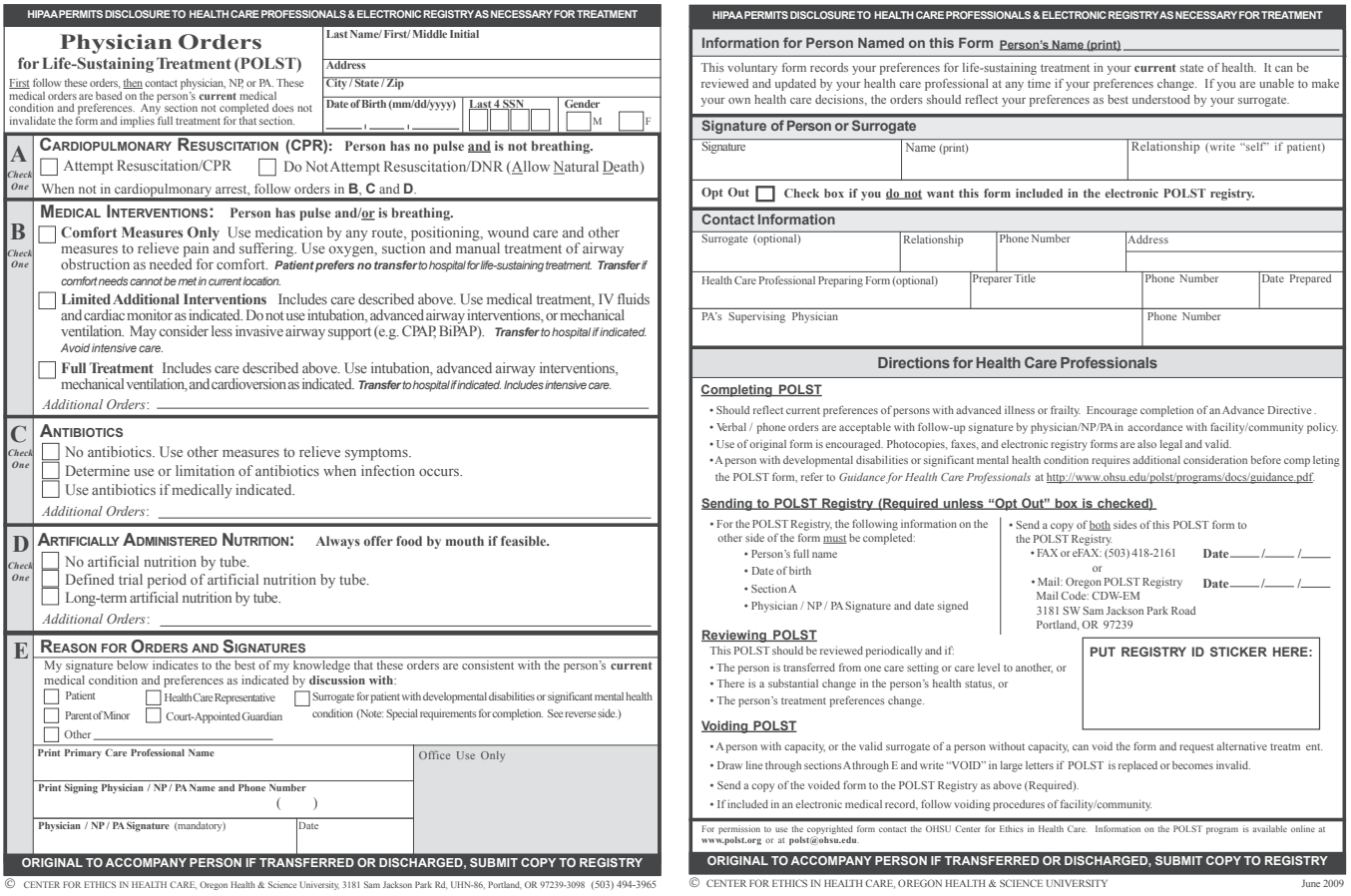
VALIDATION OF PHYSICIAN ORDERS FOR LIFE-SUSTAINING TREATMENT: ELECTRONIC REGISTRY TO GUIDE EMERGENCY CARE

To the Editor: In 1990, healthcare leaders in Oregon created a concise, standardized form that documents medical orders based on a patient's preferences regarding life-sustaining treatments, known as the Physician Orders for Life Sustaining Treatment (POLST) form (Figure 1).[1] More than 34 states and communities are currently using or in the process of adopting POLST programs (see www.polst.org for a current list of programs).[2] In 2009, Oregon implemented the first electronic POLST Registry, disseminating form information through a 24/7 call center to emergency medical services (EMS) providers, emergency departments, and acute care units. To function effectively and provide the intended service to the public, a registry must accurately match patients to their forms. This study sought to validate the current real-time search algorithm that the Oregon POLST Registry uses.

This was a secondary analysis of a prospective cohort of emergency healthcare provider calls to the registry to locate a POLST form for direct patient care between December 3, 2009, and July 31, 2010. A standardized data collection tool was used to systematically collect demographic information from the medical charts of each patient for whom the registry was called. Probabilistic linkage was then used to compare these with the patient population in the registry at the time of each request that did not initially result in a match to confirm whether the patient had a form in the Registry (LinkSolv version 5.0; Strategic Matching, Inc., Morrisonville, NY). Probabilistic linkage is a method used to link patient care records from two different settings when unique identifiers are not available.[3–6] To ensure that all true matches were identified, all cases with a positive cumulative match weight from the linkage analysis and the matches that the current algorithm initially identified were manually reviewed. For a patient to be considered a true "match," identical information for their first name, last name, and date of birth needed to be present. Descriptive analysis was then used to describe the sample and compare it with all registrants



HIPAA PERMITS DISCLOSURE TO HEALTH CARE PROFESSIONALS & ELECTRONIC REGISTRY AS NECESSARY FOR TREATMENT

Physician Orders for Life-Sustaining Treatment (POLST)

First follow these orders, then contact physician, NP, or PA. These medical orders are based on the person's **current** medical condition and preferences. Any section not completed does not invalidate the form and implies full treatment for that section.

Last Name/ First/ Middle Initial | Address | City / State / Zip | Date of Birth (mm/dd/yyyy) | Last 4 SSN | Gender M F

A Check One — **CARDIOPULMONARY RESUSCITATION (CPR):** Person has no pulse and is not breathing.
☐ Attempt Resuscitation/CPR ☐ Do Not Attempt Resuscitation/DNR (Allow Natural Death)
When not in cardiopulmonary arrest, follow orders in **B**, **C** and **D**.

B Check One — **MEDICAL INTERVENTIONS:** Person has pulse and/or is breathing.
☐ **Comfort Measures Only** Use medication by any route, positioning, wound care and other measures to relieve pain and suffering. Use oxygen, suction and manual treatment of airway obstruction as needed for comfort. ***Patient prefers no transfer*** *to hospital for life-sustaining treatment.* ***Transfer*** *if comfort needs cannot be met in current location.*
☐ **Limited Additional Interventions** Includes care described above. Use medical treatment, IV fluids and cardiac monitor as indicated. Do not use intubation, advanced airway interventions, or mechanical ventilation. May consider less invasive airway support (e.g. CPAP, BiPAP). ***Transfer*** *to hospital if indicated. Avoid intensive care.*
☐ **Full Treatment** Includes care described above. Use intubation, advanced airway interventions, mechanical ventilation, and cardioversion as indicated. ***Transfer*** *to hospital if indicated. Includes intensive care.*
Additional Orders: _____

C Check One — **ANTIBIOTICS**
☐ No antibiotics. Use other measures to relieve symptoms.
☐ Determine use or limitation of antibiotics when infection occurs.
☐ Use antibiotics if medically indicated.
Additional Orders: _____

D Check One — **ARTIFICIALLY ADMINISTERED NUTRITION:** Always offer food by mouth if feasible.
☐ No artificial nutrition by tube.
☐ Defined trial period of artificial nutrition by tube.
☐ Long-term artificial nutrition by tube.
Additional Orders: _____

E **REASON FOR ORDERS AND SIGNATURES**
My signature below indicates to the best of my knowledge that these orders are consistent with the person's **current** medical condition and preferences as indicated by **discussion with**:
☐ Patient ☐ Health Care Representative ☐ Surrogate for patient with developmental disabilities or significant mental health condition (Note: Special requirements for completion. See reverse side.)
☐ Parent of Minor ☐ Court-Appointed Guardian
☐ Other _____

Print Primary Care Professional Name | Office Use Only
Print Signing Physician / NP / PA Name and Phone Number ( )
Physician / NP / PA Signature (mandatory) | Date

ORIGINAL TO ACCOMPANY PERSON IF TRANSFERRED OR DISCHARGED, SUBMIT COPY TO REGISTRY

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HIPAA PERMITS DISCLOSURE TO HEALTH CARE PROFESSIONALS & ELECTRONIC REGISTRY AS NECESSARY FOR TREATMENT

Information for Person Named on this Form Person's Name (print) _____

This voluntary form records your preferences for life-sustaining treatment in your **current** state of health. It can be reviewed and updated by your health care professional at any time if your preferences change. If you are unable to make your own health care decisions, the orders should reflect your preferences as best understood by your surrogate.

Signature of Person or Surrogate

Signature | Name (print) | Relationship (write "self" if patient)

Opt Out ☐ **Check box if you do not want this form included in the electronic POLST registry.**

Contact Information

Surrogate (optional) | Relationship | Phone Number | Address
Health Care Professional Preparing Form (optional) | Preparer Title | Phone Number | Date Prepared
PA's Supervising Physician | Phone Number

Directions for Health Care Professionals

Completing POLST
- Should reflect current preferences of persons with advanced illness or frailty. Encourage completion of an Advance Directive .
- Verbal / phone orders are acceptable with follow-up signature by physician/NP/PA in accordance with facility/community policy.
- Use of original form is encouraged. Photocopies, faxes, and electronic registry forms are also legal and valid.
- A person with developmental disabilities or significant mental health condition requires additional consideration before comp leting the POLST form, refer to *Guidance for Health Care Professionals* at http://www.ohsu.edu/polst/programs/docs/guidance.pdf.

Sending to POLST Registry (Required unless "Opt Out" box is checked)
- For the POLST Registry, the following information on the other side of the form must be completed:
  - Person's full name
  - Date of birth
  - Section A
  - Physician / NP / PA Signature and date signed
- Send a copy of both sides of this POLST form to the POLST Registry.
  - FAX or eFAX: (503) 418-2161 **Date** ____ /____ /____
  - or
  - Mail: Oregon POLST Registry **Date** ____ /____ /____
    Mail Code: CDW-EM
    3181 SW Sam Jackson Park Road
    Portland, OR 97239

Reviewing POLST
This POLST should be reviewed periodically and if:
- The person is transferred from one care setting or care level to another, or
- There is a substantial change in the person's health status, or
- The person's treatment preferences change.

PUT REGISTRY ID STICKER HERE:

Voiding POLST
- A person with capacity, or the valid surrogate of a person without capacity, can void the form and request alternative treatm ent.
- Draw line through sections A through E and write "VOID" in large letters if POLST is replaced or becomes invalid.
- Send a copy of the voided form to the POLST Registry as above (Required).
- If included in an electronic medical record, follow voiding procedures of facility/community.

For permission to use the copyrighted form contact the OHSU Center for Ethics in Health Care. Information on the POLST program is available online at **www.polst.org** or at **polst@ohsu.edu**.

ORIGINAL TO ACCOMPANY PERSON IF TRANSFERRED OR DISCHARGED, SUBMIT COPY TO REGISTRY

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Figure 1. The 2009 Oregon Physician Orders for Life Sustaining Treatment (POLST) form.

(SAS version 9.2; SAS Institute, Inc., Cary, NC). The institutional review boards of Oregon Public Health, Oregon Health & Science University, and EMS agencies and hospitals participating in the study (where applicable) approved this study.

Two hundred thirty telephone requests were made to the registry during the 8-month period. Fourteen EMS agencies and 25 hospitals were represented in the 207 requests for which the requester's institution (EMS agency or hospital) was recorded. Of these 207 requests, 180 charts were received, forming the primary sample. Of the 180 charts received, 93 (51.7%) came from EMS. The median age of patients was 83 (range 5 months–104 years), and 42.8% of the sample was male.

There were 32 matches to registry patients identified during the study period, including 29 confirmed matches identified by the current algorithm and three "missed matches" identified through probabilistic linkage methods. Further analysis of these revealed that two of the three missed matches were due to name mismatches—the first name searched did not match the first name in the registry (i.e., alternate spelling searched or middle name searched). The third match was missed because the year of birth searched did not match the birth year recorded in the registry. The overall sensitivity of the current algorithm was 90.6% (75.0–98.0%) and specificity was estimated at 100% (97.5–100%), indicative of no false matches.

This study describes the validation of an algorithm that the Oregon POLST Registry uses to match patients with their POLST form and thus guide care based on patient preferences during real-time emergencies. The current algorithm has high specificity and sensitivity, suggesting that it is safe and effective in matching patients and forms. This is critically important given the clinical implications of acting (or not acting) based on false information and possibly withholding resuscitation from a patient who wants it.

This study has some limitations. First, it was possible to track information from only 180 of the initial 230 registry requests. Recording information on the requester's institution (or agency) is not a standardized process, which resulted in several cases in which the original chart could not be located. Second, the sample size was modest, resulting in wide confidence intervals around accuracy estimates, particularly for sensitivity.

In conclusion, these findings reinforce the importance of electronic POLST registries to potentially alleviate unnecessary suffering and the burden placed on family and caregivers by facilitating access to predetermined patient wishes, even in an emergency.

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Author Contributions: Study design: Olszewski, Newgard, McConnell. Acquisition of subjects: Olszewski, Zive, Schmidt. Data analysis and interpretation: Olszewski, Newgard. Manuscript preparation: Olszewski, Newgard, Zive, Schmidt, McConnell.

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BODY MASS INDEX AND COGNITION

To the Editor: Ghaderpanahi et al.[1] reported an interesting cross-sectional study from Tehran of 108 elderly adults classified according to body mass index (BMI) into four groups: underweight (<18.5 kg/m^2), normal (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese ($\geq$30.0 kg/m^2). When Mini-Mental State Examination (MMSE) score was less than 22, a psychiatrist confirmed the diagnosis of dementia using the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. They used normal BMI for the reference group. Multivariate adjustment showed that the overweight group had the lowest relative risk for dementia (0.24) and that the obese group had the highest (1.43). The underweight group had a relative risk of 0.43 for dementia.

A 12-month longitudinal study to assess cognitive decline relative to BMI is reported herein. Ninety-four community-dwelling individuals attending a memory clinic and residing 100 km north of Sydney Australia who were free of dementia at baseline were selected in a consensus conference of a geriatrician (PR) and clinical nurse consultant (EH). Participants had initial MMSE scores of 22 to 30. At baseline and 6 and 12 months, the MMSE,[2] Montreal Cognitive Assessment,[3] Frontal Assessment Battery,[4] and Addenbrooke Cognitive Assessment[5] were administered—a total of 12 comparisons. Table 1 shows that the underweight group had the lowest cognitive scores of the four groups in all 12 comparisons (chance would suggest 3/12 comparisons), whereas the overweight group had the highest cognitive scores in nine of 12 comparisons. Thus these results are consistent with those of Ghaderpanahi and colleagues' study[1] for overweight but not underweight individuals, although the current study did not attempt multivariate adjustment for age, sex, education, smoking, serum cholesterol, diabetes mellitus, hypertension, and cardiovascular disease. Ghaderpanahi and colleagues did not adjust for apolipoprotein E genotype.

Recently the Health in Men Study[6] reported on 4,227 men aged 70 to 89 who were free of dementia according to hospital diagnoses for a mean of 5.8 years. The reference group was 1,450 men (34.4% of the total sample) with a BMI less than 25.0 kg/m^2. Two thousand one hundred forty-six men (50.9% of the sample) were overweight (BMI 25.0–29.9 kg/m^2). They had hazard ratio (HR) of 0.66 for incident dementia. The 617 obese men (BMI $\geq$ 30.0 kg/m^2; 14.7% of the sample) had a HR of 0.84 for incident dementia.

Table 1. Comparison of Cognitive Scores According to Body Mass Index

Test	Underweight, n = 3	Normal Weight, n = 25	Overweight, n = 43	Obese, n = 23)
Female, n (%)	3 (100)	14 (56)	18 (42)	11 (48)
Age, mean ± SD	78.0 ± 4.6	80.0 ± 6.7	78.9 ± 7.2	77.2 ± 6.0
Score at 1 month, mean ± SD				
MMSE	23.0 ± 1.7	23.0 ± 1.7	25.4 ± 2.7	26.0 ± 2.2
MoCA	14.3 ± 0.6	19.7 ± 4.3	21.3 ± 4.8	21.2 ± 4.7
FAB	7.7 ± 1.1	11.2 ± 4.1	13.0 ± 3.1	12.2 ± 2.6
ACE	56.5 ± 3.5	71.8 ± 11.1	75.6 ± 12.0	74.6 ± 9.7
Score at 6 months, mean ± SD				
MMSE	22.3 ± 1.1	23.6 ± 4.3	25.5 ± 3.0	25.8 ± 2.5
MoCA	14.7 ± 3.5	18.8 ± 5.6	21.4 ± 4.2	20.1 ± 3.9
FAB	8.7 ± 2.1	11.4 ± 4.2	12.6 ± 3.5	12.6 ± 3.9
ACE	54.7 ± 10.6	68.8 ± 13.8	75.6 ± 10.0	74.7 ± 11.0
Score at 12 months, mean ± SD				
MMSE	21.7 ± 1.1	23.6 ± 3.8	25.2 ± 3.3	25.8 ± 2.8
MoCA	14.3 ± 3.8	18.3 ± 5.3	21.4 ± 4.4	20.9 ± 4.6
FAB	8.7 ± .06	11.4 ± 4.8	12.8 ± 3.2	12.2 ± 3.4
ACE	56.3 ± 7.5	72.2 ± 10.0	74.7 ± 12.3	73.5 ± 12.4

*P*12 denotes *P* value comparing group 1 (underweight) with group 2 (normal BMI); *P*14 compares groups 1 and 4 (obese); *P*13 compares groups 1 and 3 (overweight); *P*23 compares groups 2 and 3; *P*24 compares groups 2 and 4; *P*34 compares groups 3 and 4.

At 1 month: Montreal Cognitive Assessment (MoCA), *P*12 = .01, *P*13 = .009, *P*14 = .01; Frontal Assessment Battery (FAB), *P*14 = .01; Addenbrooke Cognitive Examination (ACE), *P*13 = .05.

At 6 months: Mini-Mental State Examination (MMSE), *P*14 = .02, *P*24 = .047; MoCA, *P*13 = .01, *P*23 = .046.

At 12 months: MMSE, *P*13 = .03, *P*14 = .03, *P*24 = .03; MoCA, *P*13 = .02, *P*14 = .03, *P*23 = .02; FAB, *P*13 = .02; ACE, *P*13 = .01, *P*14 = .04.

SD = standard deviation.