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Overview

Welcome to the Clinical Calculators User Guide.

Clinical Calculators are decision support tools based on well established algorithms that are used in current medical literature. Dragon Medical One has a library of Clinical Calculators to assist with documentation consistency and completeness in the patient's medical record; they can be used across specialties. When a calculation (for example, a heart risk score) is done, the output will be automatically transferred to the user's target location in the medical record.

To open Clinical Calculators, click  on the DragonBar and select **What You Can Say**, click the hamburger menu and then click **Clinical Calculators**; alternatively say **open clinical calculators**.

Nuance Healthcare ID

Clinical Calculators are accessible to all Dragon Medical One users who have registered for a Nuance Healthcare ID.

To register for a Nuance Healthcare ID, do the following:

1. On the DragonBar menu, select **Nuance Healthcare ID**.
2. Complete the registration form and click **Submit**.
3. You will receive a confirmation email; click the link in this email to complete the registration.

Alvarado Score for Acute Appendicitis

The Alvarado Score for Acute Appendicitis is a score-based calculator used to determine the likelihood of acute appendicitis in a patient.

Input values

Multiple choice selection for each category.

Category	Value	Score
Signs	Elevated temperature	1
	Rebound tenderness	1
	Right lower quadrant (RLQ) tenderness	2
Symptoms	Anorexia	1
	Migration of pain to RLQ	1
	Nausea or vomiting	1
Laboratory values	Leukocyte left shift	1
	Leukocytosis	2

Result values

The individual scores are summed up to arrive at the Alvarado Score for Acute Appendicitis. The following levels of likelihood of acute appendicitis are defined:

Score	Likelihood of acute appendicitis
0-4	Unlikely
5-6	Possible
7-8	Probable/likely
9-10	Definite

Example output

```
Alvarado Score for Acute Appendicitis

Signs:
    Elevated temperature: No (0 Points)
    Rebound tenderness: Yes (1 Points)
    RLQ tenderness: Yes (2 Points)
Symptoms:
    Anorexia: Yes (1 Points)
    Migration of pain to RLQ: No (0 Points)
    Nausea or vomiting: Yes (1 Points)
```

```
Laboratory values:
    Leukocyte left shift: Yes (1 Points)
    Leukocytosis: No (0 Points)

Appendicitis possible with an Alvarado Score of 6.
```

References

Alvarado A. A practical score for the early diagnosis of acute appendicitis. Ann Emerg Med. 186 May;15 (5):557-64 PubMed PMID: 3963537.

Douglas CD, Macpherson NE, Davidson PM, Gani JS. Randomised controlled trial of ultrasonography in diagnosis of acute appendicitis, incorporating the Alvarado score. BMJ. 2000 Oct 14;321(7266):919-22. PubMed PMID: 11030676; PubMed Central PMCID: PMC27498.

McKay R, Shepherd J. The use of the clinical scoring system by Alvarado in the decision to perform computed tomography for acute appendicitis in the ED. Am J Emerg Med. 2007 Jun;25(5):489-93. PubMed PMID: 17543650.

Baidya N. et al. Evaluation Of Alvarado Score In Acute Appendicitis: A Prospective Study. The Internet Journal of Surgery.

American Burn Association Referral Guidelines

The American Burn Association Referral Guidelines are a set of criteria for referring a patient to a burn center.

Input values

Selection of the applicable criteria.

Criteria for burn center referral
Partial thickness burns greater than 10% total body surface area (TBSA)
Burns involve the face, hands, feet, genitalia, perineum, or major joints
Third degree burns
Electrical burns, including lightning injury
Chemical burns
Inhalation injury
Patient has preexisting medical disorders that could complicate management, prolong recovery, or affect mortality
Patient has concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality
Patient is a child and hospital does not have qualified personnel or equipment for the care of children
Patient will require special social, emotional, or rehabilitative intervention

Result values

If at least one of the criteria is selected, the patient meets the guidelines for referral to a burn center according to the American Burn Association Guidelines.

Example output

```
American Burn Association Referral Guidelines

Partial thickness burns greater than 10% total body surface area (TBSA): No
Burns involve the face, hands, feet, genitalia, perineum, or major joints: Yes
Third degree burns: No
Electrical burns, including lightning injury: Yes
Chemical burns: No
Inhalation injury: No
Patient has preexisting medical disorders that could complicate management, prolong
recovery, or affect mortality: No
Patient has concomitant trauma (such as fractures) in which the burn injury poses the
greatest risk of morbidity or mortality: No
Patient is a child and hospital does not have qualified personnel or equipment for the
care of children: No
```

```
Patient will require special social, emotional, or rehabilitative intervention: No

Patient meets guidelines for referral to burn center.
```

References

Guidelines for the Operation of Burn Centers (pp. 79-86), Resources for Optimal Care of the Injured Patient 2006, Committee on Trauma, American College of Surgeons.

APACHE II Score

The acute physiology and chronic health evaluation (APACHE) II score is a score-based calculator used to determine the mortality risk in a patient admitted to the intensive care unit (ICU).

Input values

Selection of the units of measurement.

Units of measurement	Value
Units to use	US/Imperial
	SI/Metric

Remarks

- Temperature is converted between US/Imperial and SI/Metric units via the following formulas:
  ```
  F = C x 9/5 + 32
  C = (F - 32) x 5/9
  ```
- Creatinine is converted between US/Imperial and SI/Metric units via the following formulas:
  ```
  mg/dL = umol/L * 0.011312217194570135
  umol/L = mg/dL * 88.4
  ```

Single choice selection.

Chronic health	Value	Score
Chronic organ insufficiency or immunocompromise history	Yes, and emergency post-op	5
	Yes, and non-op	5
	Yes, and elective post-op	2
	No	0

Single choice selection.

Acute physiology	Value	Score
Patient has acute renal failure	Yes	See Creatinine (mg/dL)
	No	

Value input for each variable.

Variable	Value	Score
Age	Less than 45	0
	45 - 54	2
	55 - 64	3
	65 - 74	5
	Greater than 74	6
Temperature (°C)	36 - 38.4	0
	38.5 - 38.9 34 - 35.9	1
	32 - 33.9	2
	39 - 40.9 30 - 31.9	3
	Less than 30	4
	Greater than 40.9	5
Mean arterial pressure (mm Hg)	70 - 109	0
	50 - 69 110 - 129	2
	130 - 159	3
	Less than 50 Greater than 159	4
pH	7.33 - 7.49	0
	7.50 - 7.59	1
	7.25 - 7.32	2
	7.15 - 7.24 7.60 - 7.69	3
	Less than 7.15 Greater than 7.69	4

Variable	Value	Score
Heart rate (bpm)	70 - 109	0
	55 - 69 110 - 139	2
	40 - 54 140 - 179	3
	Less than 40 Greater than 179	4
Respiratory rate	12 - 24	0
	10 - 11 25 - 34	1
	6 - 9	2
	35 - 49	3
	Less than 6 Greater than 49	4
Sodium	130 - 149	0
	150 - 154	1
	120 - 129 155 - 159	2
	111 - 119 160 - 179	3
	Less than 111 Greater than 179	4
Potassium	3.5 - 5.4	0
	3 - 3.4 5.5 - 5.9	1
	2.5 - 2.9	2
	6 - 6.9	3
	Less than 2.5 Greater than 6.9	4

Variable	Value	Score
Creatinine (mg/dL) (if the patient has acute renal failure)	0.6 - 1.4	0
	Less than 0.6	2
	1.5 - 1.9	4
	2.0 - 3.4	6
	Greater than 3.4	8
Creatinine (mg/dL) (if the patient does not have acute renal failure)	0.6 - 1.4	0
	Less than 0.6 1.5 - 1.9	2
	2.0 - 3.4	3
	Greater than 3.4	4
Hematocrit (%)	30 - 45.9	0
	46 - 49.9	1
	20 - 29.9 50 - 59.9	2
	Less than 20 Greater than 59.9	4
White blood cell count	3.0 - 14.9	0
	15 - 19.9	1
	1.0 - 2.9 20 - 39.9	2
	Less than 1.0 Greater than 39.9	4
Glasgow coma scale	3 - 15	15 minus Glasgow coma scale (GCS) value (for example, if the GCS value is 3, the score is 12)

Value input (If FiO2 is 0.5 or more, the A-a gradient value is recorded; if FiO2 is less than 0.5, the PaO2 value is recorded).

Variable	Value	Score
A-a gradient (mm Hg) (FiO2 >= 0.5)	Less than 200	0
	200 - 349	2
	350 - 499	3
	Greater than 499	4
PaO2 (mm Hg) (FiO2 < 0.5)	Greater than 70	0
	61 - 70	1
	55 - 60	3
	Less than 55	4

Result values

The individual scores are summed up to arrive at the APACHE II Score. This score is compared to the following table to determine the approximated mortality rate:

Score	Approximated mortality rate
Less than 5	4%
5 - 9	8%
10 - 14	15%
15 - 19	25%
20 - 24	40%
25 - 29	55%
30 - 34	75%
Greater than 34	85%

Example output

```
Apache II Score

Chronic organ insufficiency or immunocompromise history: Yes, and non-op
Patient has acute renal failure: No
Age: 75 years
Temperature: 100.4 F
Mean arterial pressure: 53 mm Hg
pH : 7.52
Heart rate: 81 bpm
Respiratory rate: 26
Sodium: 153 mEq/L
Potassium: 3.4 mEq/L
Creatinine: 1.0 mg/dL
Hematocrit: 36 %
```

```
White blood cell count: 6.2
Glasgow coma scale: 13
A-a gradient: 203 mm Hg

Apache II Score: 21 points. 40% approximated mortality rate.
```

References

Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. Crit Care Med. 1985 Oct;13(10):818-29. PubMed PMID: 3928249.

Headley J, Theriault R, Smith TL. Independent validation of APACHE II severity of illness score for predicting mortality in patients with breast cancer admitted to the intensive care unit. Cancer. 1992 Jul 15;70(2):497-503. PubMed PMID: 1617599.

Capuzzo M, Valpondi V, Sgarbi A, Bortolazzi S, Pavoni V, Gilli G, Candini G, Gritti G, Alvisi R. Validation of severity scoring systems SAPS II and APACHE II in a single-center population. Intensive Care Med. 2000 Dec;26(12):1779-85. PubMed PMID: 11271085.

APGAR Score

The APGAR Score is a score-based calculator used to assess the status of a newborn infant at 1 and 5 minutes after birth.

Input values

Single choice selection for each clinical sign.

Clinical sign	Value	Score
Activity/muscle tone	Active movement	2
	Some extremity flexion/arms and legs flexed	1
	Absent/limp	0
Pulse	At or above 100 bpm	2
	Below 100 bpm	1
	Absent	0
Grimace (reflex irritability)	Sneeze/cough/pulls away	2
	Grimace	1
	No response/none	0
Appearance/skin color	Normal over entire body (all pink)	2
	Normal, except extremities (blue extremities, pink body)	1
	Blue/pale all over	0
Respiration	Good/crying	2
	Slow/irregular	1
	Absent	0

Result values

The individual scores are summed up to arrive at the APGAR Score. This score is compared to the following table to determine the status of the newborn infant:

Score	Status of the newborn infant
7 or greater	Likely normal.
Less than 7	Suggested requirement for medical intervention.

Example output

```
APGAR Score

Activity/muscle tone: Active movement (2 points)
Pulse: At or above 100 bpm (2 points)
Grimace (Reflex Irritability): Grimace (1 point)
Appearance/skin color: Normal over entire body (all pink) (2 points)
Respiration: Good/crying (2 points)

Total: 9 points. Likely normal.
```

References

Apgar V. A proposal for a new method of evaluation of the newborn infant. Curr. Res. Anesth. Analg. it takes less than 2 seconds and for experienced midwives it would take about less than 1 second. 1953;32 (4): 260-267. doi:10.1213/00000539-195301000-00041. PMID 13083014.

CHADS2 Score for Stroke Risk in Atrial Fibrillation

The CHADS2 Score for Stroke Risk in Atrial Fibrillation is a score-based calculator used to determine the risk of stroke in a patient with atrial fibrillation.

Input values

Selection of the applicable criteria.

Criteria	Score
History of CHF	1
History of hypertension	1
Age greater than or equal to 75 years	1
History of diabetes mellitus	1
Previous stroke symptoms or TIA	2

Result values

The individual scores are summed up to arrive at the CHADS2 Score. This score is compared to the following table to determine the risk percentage and level:

Score	Risk percentage	Risk level
0	1.9%	Low
1	2.8%	Intermediate
2	4.0%	
3	5.9%	High
4	8.5%	
5	12.5%	
6	18.2%	

Example output

```
CHADS2 Score for Stroke Risk in Atrial Fibrillation

History of CHF: No (0 Points)
History of Hypertension: No (0 Points)
Age greater than or equal to 75 years: Yes (1 Point)
History of Diabetes Mellitus: No (0 Points)
Previous Stroke Symptoms or TIA: Yes (2 Points)

Score: 3. Thromboembolic event high risk. Risk of event is 5.9% per year if no coumadin.
```

Note: While history of stroke provides 2 points, most physicians would move these patients directly to the high risk group (>8.5% risk of event per year if no coumadin).

References

Gage BF, van Walraven C, Pearce L, Hart RG, Koudstaal PJ, Boode BS, Petersen P. Selecting patients with atrial fibrillation for anticoagulation: stroke risk stratification in patients taking aspirin. Circulation. 2004 Oct 19;110(16):2287-92. Epub 2004 Oct 11. PubMed PMID: 15477396.

Gage BF, Waterman AD, Shannon W, Boechler M, Rich MW, Radford MJ. Validation of clinical classification schemes for predicting stroke: results from the National Registry of Atrial Fibrillation. JAMA. 2001 Jun 13;285 (22):2864-70. PubMed PMID: 11401607.

Yarmohammadi H, Varr BC, Puwanant S, Lieber E, Williams SJ, Klostermann T, Jasper SE, Whitman C, Klein AL. Role of CHADS2 score in evaluation of thromboembolic risk and mortality in patients with atrial fibrillation undergoing direct current cardioversion (from the ACUTE Trial Substudy). Am J Cardiol. 2012 Jul 15;110(2):222-6. doi: 10.1016/j.amjcard.2012.03.017. PubMed PMID: 22503581.

Central Line Insertion Practices (CLIP) Adherence Monitoring Tool

The CLIP Adherence Monitoring Tool is a documentation tool used to collect data on the central line insertion performed by a physician.

Input values

Single or multiple choice selection.

CLIP data	Value
Individual recording insertion practice data	Inserter
	Observer
Profession of inserter	Attending physician
	Fellow
	Intern/resident
	Medical student
	Other medical staff
	Other student
	Physician assistant
	PICC/IV team
	Registered nurse
	Other
Reason for insertion	New indication for CL
	Suspected CL - associated infection
	Replace malfunctioning CL
	Other
Maximal sterile barrier precautions used	Cap
	Mask/eye shield
	Large sterile drape
	Sterile gown
	Sterile gloves
Skin preparation	Chlorhexidine gluconate s
	Providone iodine
	Alcohol
Line placement location	Interventional radiology
	ICU
	NICU
	OR
	PACU
	ED
	Other

CLIP data	Value
Insertion site	Femoral
	Jugular
	Scalp (PICC)
	Subclavian
	Umbilical
	Upper Extremity (PICC)
	Lower Extremity (PICC)
Inserter performed hand hygiene prior to CL insertion	Yes
	No
Was skin preparation agent completely dry at time of first skin puncture	Yes
	No
Number of lumens	1
	2
	3
	4
	Greater than 4

Result values

A report of the collected CLIP data.

Example output

```
Central Line Insertion Practices (CLIP) Adherence Monitoring Tool

Individual recording insertion practice data: Inserter
Profession of inserter:
    Attending physician
    Other profession
Reason for insertion: Suspected CL - associated infection
Maximal sterile barrier precautions used:
    Cap: Yes
    Mask/eye Shield: Yes
    Large sterile drape: Yes
    Sterile gown: Yes
    Sterile gloves: Yes
Skin preparation:
    Reason chlorhexidine prep was not used: Patient is allergic
    Providone iodine
Line placement location: Somewhere else
```

```
Insertion site: Subclavian
Inserter performed hand hygiene prior to CL insertion: Yes
Was skin preparation agent completely dry at time of first skin puncture: Yes
Number of lumens: 3
```

References

Check with your own hospital for guidelines.

Creatinine Clearance

The Creatinine Clearance is a calculator based on the Cockcroft-Gault formula, used to determine a patient's creatinine clearance.

Input values

Single-choice selection and number input.

Criteria		Values
Units to use		Imperial units
		Metric units
Patient values	Sex	Male
		Female
	Age	Number input
	Weight	
	Creatinine level	

Result values

The patient's creatinine clearance is calculated via the following formula:

```
    Creatinine clearance = ((140 - age) x weight in kg x constant) / creatinine level in umol/L
```

The `constant` value is 1.23 for male patients and 1.04 for female patients.

If you enter values in imperial units, they will be converted to metric units automatically, via the following formulas:

```
    kg = lbs * 0.45359237
    umol/L = mg/dL * 88.4
```

Example output

```
Creatinine Clearance Calculator

Patient sex: Male
Age: 78 years
Weight: 160 lbs
Creatinine: 0.8 mg/dL

Creatinine clearance: 78.26 mL/min
```

References

Cockcroft DW, Gault MH. Prediction of creatinine clearance from serum creatinine. Nephron. 1976;16(1):31-41. PubMed PMID: 1244564.

CURB-65 Severity Score for CAP

The CURB-65 Severity Score for CAP is a score-based calculator used to estimate a patient's 30-day mortality from community-acquired pneumonia (CAP).

Input values

Selection of the applicable criteria.

Criteria	Score
Confusion	1
BUN > 19 mg/dL (7mmol/L)	1
Respiratory rate greater than or equal to 30	1
SBP less than 90 mmHg or DBP less than or equal to 60 mmHg	1
Age greater than or equal to 65	1

Result values

The individual scores are summed up and compared to the following table to arrive at the patient's 30-day mortality risk:

Score	Risk percentage	Patient's risk group
0	0.6%	Low
1	2.7%	
2	6.8%	Moderate
3	14.0%	Severe
4	27.8%	Highest
5	27.8%	

Example output

```
CURB-65 Severity Score for CAP

Confusion: Yes (1 Point)
BUN > 19 mg/dL (7mmol/L): No (0 Points)
Respiratory rate greater than or equal to 30: Yes (1 Point)
SBP less than 90 mmHg or DBP less than or equal to 60 mmHg: No (0 Points)
Age greater than or equal to 65: Yes (1 Point)

3 points. Severe risk: 14.0% 30-day mortality.
```

References

W Lim, M M van der Eerden, R Laing, W Boersma, N Karalus, G Town, S Lewis, and J Macfarlane. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. Thorax. 2003 May; 58(5): 377-382. doi: 10.1136/thorax.58.5.377. PubMed PMID: 12728155.

Shah BA, et. al. Validity of Pneumonia Severity Index and CURB-65 Severity Scoring Systems in Community Acquired Pneumonia in an Indian Setting. The Indian Journal of Chest Diseases & Allied Sciences. 2010;Vol.52. PubMed PMID: 20364609.

Aujesky D, Auble TE, Yealy DM, et al. Prospective comparison of three validated prediction rules for prognosis in community-acquired pneumonia. Am. J. Med. 2005;118(4): 384-92.doi:10.1016/j.amjmed.2005.01.006. PubMed PMID 15808136.

Myint PK, Kamath AV, Vowler SL, Maisey DN, Harrison BD. Severity assessment criteria recommended by the British Thoracic Society (BTS) for community-acquired pneumonia (CAP) and older patients. Should SOAR (systolic blood pressure, oxygenation, age and respiratory rate) criteria be used in older people? A compilation study of two prospective cohorts. Age Ageing. 2006;35(3):286-91. PubMed PMID: 16638769.

Capelastegui A, España PP, Quintana JM, et al. Validation of a predictive rule for the management of community-acquired pneumonia. Eur Respir J. 2006;27(1):151-7. PubMed PMID: 16387948.

Endotracheal Tube (ETT) Size for Pediatrics

The ETT Size for Pediatrics is a value-based calculator used to estimate optimal endotracheal tube sizes based on a pediatric patient's age.

Input values

Criteria	Values
Patient age	Number input

Result values

The optimal endotracheal tube sizes are estimated via the following formulas:

```
Estimated uncuffed size = (Age / 4) + 4
Estimated cuffed size = (Age / 4) + 3
```

Example output

```
Endotracheal Tube (ETT) Size for Pediatrics

Patient age: 3 years

Estimated uncuffed tube: 4.8
Estimated cuffed tube: 3.8
```

References

Singh NC et al, Physiological responses to endotracheal and oral suctioning in paediatric patients: the influence of endotracheal tube sizes and suction pressures. Clin Intensive Care. 1991; 2: 345-350. PubMed PMID: 10149098.

Fractional Excretion of Sodium (FENa)

The FENa is a value-based calculator used to determine a patient's fractional excretion of sodium.

Input values

Single-choice selection and number input.

Criteria		Values
Units to use		Imperial units
		Metric units
Laboratory values	Serum Na	Number input
	Urine Na	
	Serum Cr	
	Urine Cr	

Result values

The patient's fractional excretion of sodium is calculated via the following formula:

```
FENa = ((Serum Cr x Urine Na) / (Serum Na x Urine Cr)) x 100
```

Example output

```
Fractional Excretion of Sodium (FENa)

Serum Na: 23.00 mEq/L
Urine Na: 20.00 mEq/L
Serum Cr: 45.00 mEq/L
Urine Cr: 40.00 mEq/L

FENa: 97.83%
```

References

Steiner R. Interpreting the fractional excretion of sodium. Am J Med 1984; 77. (4): 699-702. doi:10.1016/0002-9343(84)90368-1. PMID 6486145.

Framingham Coronary Heart Disease Risk Score

The Framingham Coronary Heart Disease Risk Score is a value-based calculator used to determine a patient's risk of coronary heart disease.

Input values

Selection of the applicable criteria and number input.

Criteria		Values
Units to use		Imperial units
		Metric units
Patient values	Sex	Male
		Female
	Age	Number
	HDL cholesterol	
	Total cholesterol	
	Systolic BP	
Blood pressure is being treated with medication		Yes
		No
Patient smokes		Yes
		No
Patient has diabetes mellitus		Yes
		No

Use the following table to calculate the score for a male patient:

Criteria	Values	Score
Age	30 - 34	0
	35 - 39	2
	40 - 44	5
	45 - 49	6
	50 - 54	8
	55 - 59	10
	60 - 64	11
	65 - 69	12
	70 - 74	14
	Greater than 74	15
HDL cholesterol	Greater than 59	-2
	50 - 59	-1
	45 - 49	0
	35 - 44	1
	Less than 35	2
Total cholesterol	Less than 160	0
	160 - 199	1
	200 - 239	2
	240 - 279	3
	Greater than 279	4
Systolic BP not treated	Less than 120	-2
	120 - 129	0
	130 - 139	1
	140 - 159	2
	Greater than 159	3
Systolic BP treated	Less than 120	0
	120 - 129	2
	130 - 139	3
	140 - 159	4
	Greater than 159	5

Criteria	Values	Score
Smoker	No	0
	Yes	4
Diabetic	No	0
	Yes	3

Use the following table to calculate the score for a female patient:

Criteria	Values	Score
Age	30 - 34	0
	35 - 39	2
	40 - 44	4
	45 - 49	5
	50 - 54	7
	55 - 59	8
	60 - 64	9
	65 - 69	10
	70 - 74	11
	Greater than 74	12
HDL cholesterol	Greater than 59	-2
	50 - 59	-1
	45 - 49	0
	35 - 44	1
	Less than 35	2
Total cholesterol	Less than 160	0
	160 - 199	1
	200 - 239	3
	240 - 279	4
	Greater than 279	5
Systolic BP not treated	Less than 120	-3
	120 - 129	0
	130 - 139	1
	140 - 149	2
	150 - 159	4
	Greater than 159	5

Criteria	Values	Score
Systolic BP treated	Less than 120	-1
	120 - 129	2
	130 - 139	3
	140 - 149	5
	150 - 159	6
	Greater than 159	7
Smoker	No	0
	Yes	3
Diabetic	No	0
	Yes	4

Result values

The individual scores are summed up to arrive at the patient's risk of coronary heart disease.

Score	Risk in male patients	Risk in female patients
Less than -2	Less than 1%	Less than 1%
-2	1.1%	Less than 1%
-1	1.4%	1%
0	1.6%	1.2%
1	1.9%	1.5%
2	2.3%	1.7%
3	2.8%	2%
4	3.3%	2.4%
5	3.9%	2.8%
6	4.7%	3.3%
7	5.6%	3.9%
8	6.7%	4.5%
9	7.9%	5.3%
10	9.4%	6.3%
11	11.2%	7.3%
12	13.2%	8.6%
13	15.6%	10%
14	18.4%	11.7%
15	21.6%	13.7%
16	25.3%	15.9%
17	29.4%	18.5%
18	Greater than 30%	21.5%
19	Greater than 30%	24.8%
20	Greater than 30%	28.5%
Greater than 20	Greater than 30%	Greater than 30%

Example output

```
Framingham Coronary Heart Disease Risk Score

Patient sex: Male
Patient's age: 78
HDL cholesterol: 23mg/dL
Total cholesterol: 45mg/dL
Systolic BP: 115mm Hg
```

```
Blood pressure is being treated with medication: Yes
Patient smokes: No
Patient has diabetes mellitus: No

29.4% risk of heart attack or death within the next 10 years.
```

References

Wilson PWF, D'Agostino RB, Levy D, Belanger AM, Silbershatz H, Kannel WB. Prediction of coronary heart disease using risk factor categories. Circulation. 1998;97:1837-47. doi: 10.1161/01.CIR.97.18.1837. PubMed PMID: 9603539.

The Expert Panel Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. Circulation. 2002;106:3143-3421. PubMed PMID: 12485966.

D'Agostino RB, Sr, Vasan RS, Pencina MJ, et al. General cardiovascular risk profile for use in primary care: the Framingham Heart Study. Circulation. 2008;117:743-753. doi: 10.1161/CIRCULATIONAHA.107.699579. PubMed PMID: 18212285.

Glasgow Coma Scale Calculator (GCS)

The GCS is a score-based calculator used to determine the depth of impaired consciousness or coma in a patient.

Input values

Single-choice selection.

Criteria	Values
Patient type	Adult
	Pediatric

Single-choice selection for adult patients.

Criteria	Values	Score
Best eye response	Does not open eyes	1
	Opens eyes to painful stimuli	2
	Opens eyes to voice	3
	Opens eyes spontaneously	4
Best verbal response	Makes no sound	1
	Incomprehensible sounds	2
	Utters inappropriate words	3
	Confused, disoriented	4
	Oriented, converses normally	5
Best motor response	Makes no movement	1
	Extension to pain	2
	Abnormal flexion to pain	3
	Flexes/withdraws from pain	4
	Localizes to pain	5
	Obeys commands	6

Single-choice selection for pediatric patients.

Criteria	Values	Score
Best eye response	Does not open eyes	1
	Opens eyes to painful stimuli	2
	Opens eyes to voice	3
	Opens eyes spontaneously	4
Best verbal response	No verbal response	1
	Inconsolable, agitated	2
	Inconsistently inconsolable	3
	Cries but consolable	4
	Interacts, smiles, orients to sounds	5
Best motor response	No motor response	1
	Extension to pain	2
	Abnormal flexion to pain	3
	Withdraws from pain	4
	Withdraws from touch	5
	Moves spontaneously	6

Result values

The individual scores are summed up to arrive at the patient's GCS score.

Example output 1

```
Adult Glasgow Coma Scale (GCS)

Eyes: Opens eyes to voice (3 points)
Verbal: Oriented, converses normally (5 points)
Motor: Abnormal flexion to pain (3 points)

Total GCS: 11 points
```

Example output 2

```
Pediatric Glasgow Coma Scale (GCS)

Eyes: Opens eyes to painful stimuli (2 points)
Verbal: Cries but consolable (4 points)
Motor: Extension to pain (2 points)

Total GCS: 8 points
```

References

Teasdale G, Jennett B. Assessment of coma and impaired consciousness. A practical scale. Lancet. 1974 Jul 13;2(7872):81-4. PubMed PMID: 4136544.

HEART Score for Major Cardiac Event

The HEART score is a score-based calculator used to determine a patient's risk of a major cardiac event.

Input values

Single-choice selection for each category.

Criteria	Values	Score
History	Highly suspicious	2
	Moderately suspicious	1
	Slightly suspicious	0
ECG	Significant ST deviation	2
	Nonspecific repolarisation disturbance/LBTB/PM	1
	Normal	0
Age	65 years or older	2
	46 to 64 years	1
	45 years or younger	0
Risk factors	At least 3 risk factors or history of atherosclerotic disease	2
	1 or 2 risk factors	1
	No risk factors known	0
Troponin	3 times normal limit or higher	2
	1 to 3 times normal limit	1
	Normal limit or below	0

Result values

The individual scores are summed up to arrive at the patient's HEART score. This score is compared to the following table to determine the risk percentage:

Score	Risk percentage
0 - 3	1.6%
4 - 6	13%
7 - 10	50%

Example output

```
HEART Score for Major Cardiac Event
```

```
History: Moderately suspicious (1 point)
ECG: Normal (0 points)
Age: 65 years or older (2 points)
Risk factors: 1 or 2 risk factors (1 point)
Troponin: 1 to 3 times normal limit (1 point)

Total: 5 points. 13% risk of MACE.
```

References

HEART Score Study.

Six AJ, Backus BE, Kelder JC. Chest pain in the emergency room: value of the HEART score. Neth Heart J. 2008 Jun;16(6):191-6. PubMed PMID: 18665203.

Backus BE, Six AJ, Kelder JC, Bosschaert MA, Mast EG, Mosterd A, Veldkamp RF, Wardeh AJ, Tio R, Braam R, Monnink SH, van Tooren R, Mast TP, van den Akker F, Cramer MJ, Poldervaart JM, Hoes AW, Doevendans PA. A prospective validation of the HEART score for chest pain patients at the emergency department. Int J Cardiol. 2013 Oct 3;168(3):2153-8. doi: 10.1016/j.ijcard.2013.01.255. Epub 2013 Mar 7. PubMed PMID: 23465250.

HIV Needle Stick Risk Assessment Stratification Protocol (RASP)

The RASP is a score-based calculator used to determine a patient's risk of HIV exposure.

Input values

Single-choice selection for each category.

Criteria	Values	Score
Source population	Known carrier: Acute AIDS illness	1
	Known carrier: Asymptomatic	10
	Unknown status: High-risk situation	100
	Unknown status: Low-risk situation	1000
Inoculum type	Fresh blood	1
	Other high-risk fluids	10
	Dried old blood	100
	Low-risk secretions	1000
Method of transmission	Intravenous	1
	Deep intramuscular	10
	Deep transcutaneous with visible bleeding	100
	Superficial transcutaneous without bleeding	200
	Mucosal contact only	500
	Intact skin	1000
Volume of inoculum	Massive	100
	Measurable (more than 1 mL)	10
	Moderate (large-bore, hollow needle greater than 22G)	5
	Small (small-bore, hollow needle)	3
	Trace	1

Result values

The risk of HIV exposure is calculated via the following formulas:

```
Total score = Source population x Inoculum type x Method of transmission
Basic risk = 1 / Total score
Total risk = Basic risk x Volume of inoculum x 100
Risk ratio = Total score / Volume of inoculum
```

The risk ratio is compared to the following table to determine the recommended treatment:

Risk ratio	Recommended treatment
Less than 1,000	Treatment definitely indicated.
1,000 - 10,000	Treatment recommended but optional.
10,001 - 100,000	Treatment optional but not recommended.
Greater than 100,000	Treatment optional but not recommended.

Example output

```
HIV Needle Stick Risk Assessment Stratification Protocol (RASP)

Source population: Known carrier: Asymptomatic
Inoculum type: Dried old blood
Method of transmission: Deep intramuscular
Volumen of inoculum: Small (small-bore, hollow needle)

Total risk: 0.04% or 1 in 3,333. Treatment recommended but optional.
```

References

Vertesi L. Risk Assessment Stratification Protocol (RASP) to help patients decide on the use of postexposure prophylaxis for HIV exposure. CJEM. 2003 Jan;5(1):46-8. PubMed PMID: 17659153.

Maintenance Fluids Calculator

The Maintenance Fluids Calculator is a value-based calculator used to determine a patient's rate of maintenance fluids required. The pediatric bolus is also calculated for pediatric patients.

Input values

Single-choice selection and number input.

Criteria	Values
Units to use	Imperial units
	Metric units
Patient type	Adult
	Pediatric
Patient weight	Number input

Result values

The patient's rate of maintenance fluids is calculated via the 4-2-1 rule:

Patient weight	Rate of maintenance fluids
0 - 10 kg	`(4 mL/kg/hr) x constant`
10 - 20 kg	`(+2 mL/kg/hr) x constant`
Greater than 20 kg	`(+1 mL/kg/hr) x constant`

The `constant` value is 1 for adult patients and 1.5 for pediatric patients.

For example:

Patient weight	Rate of maintenance fluids
8 kg	`(8 x 4) x 1.5 mL/hr`
14 kg	`((10 x 4) + (4 x 2)) x 1.5 mL/hr`
56 kg	`(10 x 4) + (10 x 2) + (36 x 1) mL/hr`

For pediatric patients, the pediatric bolus is also calculated via the following formula:

```
Pediatric bolus = Patient weight x 20 mL
```

If you enter the patient weight in imperial units, it will be converted to metric units automatically, via the following formula:

```
kg = lbs * 0.45359237
```

Example output 1

```
Maintenance Fluids Calculations
```

```
Patient weight: 150 lbs

Maintenance fluids: 108 mL/hr
```

Example output 2

```
Maintenance Fluids Calculations

Patient weight: 60 lbs

Maintenance fluids: 100 mL/hr
Pediatric bolus: 540 mL
```

References

Holliday MA, Segar WE. The maintenance need for water in parenteral fluid therapy. Pediatrics 1957. PubMed PMID: 13431307.

Oh TH. Formulas for calculating fluid maintenance requirements. Anesthesiology.1980;53:351. PubMed PMID: 7425366.

Arya VK. Basics of fluid and blood transfusion therapy in paediatric surgical patients. Indian Journal of Anaesthesia 2012;56(5):454-462. doi:10.4103/0019-5049.103960. PubMed PMID: 23293384.

Modified Centor Score for Strep Pharyngitis

The Modified Centor Score for Strep Pharyngitis is a score-based calculator used to determine the probability of strep pharyngitis in a patient.

Input values

Single-choice selection and selection of the applicable criteria.

Criteria	Values	Score
Patient age	3-14 years old	1
	15-44 years old	0
	45 or more years old	-1
Diagnostic factors	Exudate or swelling on tonsils	1
	Tender/swollen anterior cervical lymph nodes	1
	Fever (T > 38 deg C, 100.4 deg F)	1
	No cough	1

Result values

The individual scores are summed up to arrive at the Modified Centor Score for Strep Pharyngitis. This score is compared to the following table to determine the probability of strep pharyngitis in the patient:

Score	Probability
Less than 1	1 - 2.5%
1	5 - 10%
2	11 - 17%
3	28 - 25%
Greater than 3	51 - 53%

Example output

```
Modified Centor Score for Strep Pharyngitis

Patient age: 15-44 years old (0 points)
Exudate or swelling on tonsils: No (0 points)
Tender/swollen anterior cervical lymph nodes: No (0 points)
Fever (T > 38 deg C, 100.4 deg F): Yes (1 point)
No cough: Yes (1 point)

Total score: 2. 11-17% probability of strep pharyngitis.
```

References

Centor RM, Witherspoon JM, Dalton HP, Brody CE, Link K. The diagnosis of strep throat in adults in the emergency room. Med Decis Making. 1981;1(3):239-46. PubMed PMID: 6763125.

McIsaac WJ, Kellner JD, Aufricht P, Vanjaka A, Low DE. Empirical Validation of Guidelines for the Management of Pharyngitis in Children and Adults. JAMA.2004;291(13):1587-1595. doi:10.1001/jama.291.13.1587. PubMed PMID: 15069046.

Fine AM, Nizet V, Mandl KD. Large-Scale Validation of the Centor and McIsaac Scores to Predict Group A Streptococcal Pharyngitis. Archives of internal medicine2012;172(11):847-852. doi:10.1001/archinternmed.2012.950. PubMed PMID: 22566485.

NEXUS Criteria for Imaging of C-Spine

The NEXUS Criteria for Imaging of C-Spine is a calculator used to determine a patient's risk of a cervical spine injury.

Input values

Selection of the applicable criteria.

Criteria
Focal neuro deficit
Spinal midline tenderness
ALOC
Intoxication
Distracting injury

Result values

If one or more of the criteria are selected, there is a risk of a cervical spine injury and imaging is required.

Example output 1

```
NEXUS Criteria for Imaging of C-Spine

Focal neuro deficit: No
Spinal midline tenderness: Yes
ALOC: Yes
Intoxication: Yes
Distracting injury: No

C-spine cannot be clinically cleared. Imaging is required.
```

Example output 2

```
NEXUS Criteria for Imaging of C-Spine

Focal neuro deficit: No
Spinal midline tenderness: No
ALOC: No
Intoxication: No
Distracting injury: No

C-spine can be clinically cleared. No imaging required.
```

References

Hoffman JR, Wolfson AB, Todd K, Mower WR. Selective cervical spine radiography in blunt trauma: methodology of the National Emergency X-Radiography Utilization Study (NEXUS). Ann Emerg Med. 1998 Oct;32(4):461-9. PubMed PMID: 9774931.

Hoffman JR, Mower WR, Wolfson AB, Todd KH, Zucker MI. Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. National Emergency X-Radiography Utilization Study Group. N Engl J Med. 2000 Jul 13;343(2):94-9. Erratum in: N Engl J Med 2001 Feb 8;344(6):464. PubMed PMID: 10891516.

Stiell IG, Clement CM, McKnight RD, Brison R, Schull MJ, Rowe BH, Worthington JR, Eisenhauer MA, Cass D, Greenberg G, MacPhail I, Dreyer J, Lee JS, Bandiera G, Reardon M, Holroyd B, Lesiuk H, Wells GA. The Canadian C-spine rule versus the NEXUS low-risk criteria in patients with trauma. N Engl J Med. 2003 Dec 25;349(26):2510-8. PubMed PMID: 14695411.

NIH Stroke Scale Calculator

The NIH Stroke Scale is a score-based calculator used to asses a possible stroke patient.

Input values

Single-choice selection.

Criteria	Values	Score
Level of consciousness	Alert	0
	Not alert, but arousable with minimal stimulation	1
	Not alert, requires repeated stimulation to attend	2
	Coma	3
Ask patient current month and age	Answers both correctly	0
	Answers one correctly	1
	Both incorrect	2
Ask patient to open and close eyes	Obeys both correctly	0
	Obeys one correctly	1
	Both incorrect	2
Best gaze	Normal	0
	Partial gaze palsy	1
	Forced deviation	2
Visual field testing	No visual field loss	0
	Partial hemianopia	1
	Complete hemianopia	2
	Bilateral hemianopia	3
Facial paresis	Normal symmetrical movement	0
	Minor paralysis	1
	Major paralysis	2
	Complete paralysis of one or both sides	3
Motor function - left arm	Normal	0
	Drift	1
	Some effort against gravity	2
	No effort against gravity	3
	No movement	4
	Untestable	Text input to describe why the function is untestable. Default value: Amputation or joint fusion.

Motor function - right arm	Normal	0
	Drift	1
	Some effort against gravity	2
	No effort against gravity	3
	No movement	4
	Untestable	Text input to describe why the function is untestable. Default value: Amputation or joint fusion.
Motor function - left leg	Normal	0
	Drift	1
	Some effort again gravity	2
	No effort against gravity	3
	No movement	4
	Untestable	Text input to describe why the function is untestable. Default value: Amputation or joint fusion.
Motor function - right leg	Normal	0
	Drift	1
	Some effort again gravity	2
	No effort against gravity	3
	No movement	4
	Untestable	Text input to describe why the function is untestable. Default value: Amputation or joint fusion.
Limb ataxia	No ataxia	0
	Present in one limb	1
	Present in two limbs	2
	Untestable	Text input to describe why ataxia is untestable. Default value: Amputation or joint fusion.
Sensory	Normal	0
	Mild to moderate decrease in sensation	1
	Severe to total sensory loss	2
Best language	No aphasia	0
	Mild to moderate aphasia	1
	Severe aphasia	2
	Mute	3

Dysarthria	Normal articulation	0
	Mild to moderate slurring of words	1
	Near unintelligible or unable to speak	2
	Untestable	Text input to describe why dysarthria is untestable. Default value: Intubated or other physical barrier.
Extinction and inattention	Normal	0
	Bilateral simultaneous stimulation in a sensory modality	1
	Severe hemi-inattention to more than one modality	2

Result values

The individual scores are summed up to arrive at the patient's NIH Stroke Score. No points are added to the total for untestable criteria.

Example output

```
NIH Stroke Scale Calculator

1.  a. Level of consciousness: Not alert, but arousable with minimal stimulation (1
point)
b. Patient asked current month and age: Answers both correctly (0 points)
c. Patient asked to open and close eyes: Obeys both correctly (0 points)
2.  Base gaze: Partial gaze palsy (1 point)
3.  Visual field testing: No visual field loss (0 points)
4.  Facial paresis: Major paralysis (2 points)
5.  a. Motor function - left arm: Amputation or joint fusion (Untestable)
b. Motor function - right arm: Normal (0 points)
6.  a. Motor function - left leg: No effort against gravity (3 points)
b. Motor function - right leg: No movement (4 points)
7. Limb ataxia: No ataxia (0 points)
8.  Sensory: Normal (0 points)
9.  Best language: Mute (3 points)
10. Dysarthria: Intubated or other physical barrier (Untestable)
11. Extinction and inattention: Bilateral simultaneous stimulation in a sensory modality
(1 point)

Total: 15 points
```

References

NIH Stroke Scale website.

NIH Stroke Scale Booklet.

Brott T, Adams HP Jr, Olinger CP, Marler JR, Barsan WG, Biller J, Spilker J,Holleran R, Eberle R, Hertzberg V, et al. Measurements of acute cerebral infarction: a clinical examination scale. Stroke. 1989 Jul;20(7):864-70. PubMed PMID: 2749846.

Johnston KC, Connors AF Jr, Wagner DP, Haley EC Jr. Predicting outcome in ischemic stroke: external validation of predictive risk models. Stroke. 2003 Jan;34(1):200-2. PubMed PMID: 12511774.

Adams HP Jr, Davis PH, Leira EC, Chang KC, Bendixen BH, Clarke WR, Woolson RF, Hansen MD. Baseline NIH Stroke Scale score strongly predicts outcome after stroke: A report of the Trial of Org 10172 in Acute Stroke Treatment (TOAST). Neurology. 1999 Jul 13;53(1):126-31. PubMed PMID: 10408548.

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Rundek T, Mast H, Hartmann A, Boden-Albala B, Lennihan L, Lin IF, Paik MC, Sacco RL. Predictors of resource use after acute hospitalization: the Northern Manhattan Stroke Study. Neurology. 2000 Oct 24;55 (8):1180-7. PubMed PMID: 11071497.

Appelros P, Terént A. Characteristics of the National Institute of Health Stroke Scale: results from a population-based stroke cohort at baseline and after one year. Cerebrovasc Dis. 2004;17(1):21-7. Epub 2003 Oct 3. PubMed PMID: 14530634.

Ottawa Ankle Rules

The Ottawa Ankle Rules is a calculator used to determine if a patient's ankle injury requires imaging.

Input values

Selection of the applicable criteria.

Criteria
Unable to bear weight immediately and in ED
Tender on lateral malleolar tip or posterior aspect of lateral malleolus
Tender on medial malleolar tip or posterior aspect of medial malleolus

Result values

If one or more criteria are selected, the patient's ankle injury requires imaging.

Example output 1

```
Ottawa Ankle Rules

Unable to bear weight immediately and in ED: No
Tender on lateral malleolar tip or posterior aspect of lateral malleolus: No
Tender on medial malleolar tip or posterior aspect of medial malleolus: No

No ankle X-Ray films required.
```

Example output 2

```
Ottawa Ankle Rules

Unable to bear weight immediately and in ED: Yes
Tender on lateral malleolar tip or posterior aspect of lateral malleolus: No
Tender on medial malleolar tip or posterior aspect of medial malleolus: Yes

Ankle X-Ray films are required.
```

References

Stiell IG, Greenberg GH, McKnight RD, Nair RC, McDowell I, Worthington JR. A study to develop clinical decision rules for the use of radiography in acute ankle injuries. Ann Emerg Med. 1992; 21:384-90. PubMed PMID: 1554175.

Stiell IG, Greenberg GH, McKnight RD, Nair RC, McDowell I, Reardon M, Stewart JP, Maloney J. Decision rules for the use of radiography in acute ankle injuries. Refinement and prospective validation. JAMA. 1993 Mar 3;269(9):1127-32. PubMed PMID: 8433468.

Stiell, I.G., R.D. McKnight, G.H. Greenberg et collab. Implementation of the Ottawa Ankle Rules. JAMA, no 271. 1994, p. 827-832. PubMed PMID: 8114236.

Stiell IG, Wells GA, Laupacis A, Brison R, Verbeek R, Vandemheen K, Naylor CD. A multicentre trial to introduce clinical decision rules for the use of radiography in acute ankle injuries. Br Med J 1995;311:594-597. PubMed PMID: 7663253.

Plint AC, Bulloch B, Osmond MH, Stiell I, Dunlap H, Reed M, Tenenbein M, Klassen TP. Validation of the Ottawa Ankle Rules in children with ankle injuries. Acad Emerg Med. 1999; 6(10)10005-9. PubMed PMID: 10530658.

Bachmann LM, et. al. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review BMJ 2003;326:417. doi: http://dx.doi.org/10.1136/bmj.326.7386.417 (Published 22 February 2003). PubMed PMID: 12595378.

Ottawa Knee Rules

The Ottawa Knee Rules is a calculator used to determine if a patient's knee injury requires imaging.

Input values

Selection of the applicable criteria.

Criteria
Age greater than or equal to 55
Isolated tenderness of patella (no other bony tenderness)
Tenderness at fibular head
Unable to flex knee to 90 degrees
Unable to bear weight both immediately and in ED (4 steps, limping is okay)

Result values

If one or more criteria are selected, the patient's knee injury clinically requires imaging.

Example output 1

```
Ottawa Knee Rules

Age greater than or equal to 55: No
Isolated tenderness of patella (no other bony tenderness): No
Tenderness at fibular head: No
Unable to flex knee to 90 degrees: No
Unable to bear weight both immediately and in ED (4 steps, limping is okay): No

No indicated knee imaging.
```

Example output 2

```
Ottawa Knee Rules

Age greater than or equal to 55: No
Isolated tenderness of patella (no other bony tenderness): No
Tenderness at fibular head: Yes
Unable to flex knee to 90 degrees: No
Unable to bear weight both immediately and in ED (4 steps, limping is okay): Yes

Knee imaging may be indicated.
```

References

Stiell IG, et al. Derivation of a decision rule for the use of radiography in acute knee injuries. Annals of Emergency Medicine. 1995; 26(10): 405-13. PubMed PMID: 7574120.

Stiell IG, et al. Prospective validation of a decision rule for the use of radiography in acute knee injuries. JAMA. 1996; 275(8): 611-5. PubMed PMID: 8594242.

Emparanza JI and Aginaga JR. Validation of the Ottawa knee rules. Annals of Emergency Medicine. 2001; 38 (10):364-8. PubMed PMID: 11574791.

Stiell IG, et al. Implementation of the Ottawa knee rule for the use of radiography in acute knee injuries. JAMA. 1997; 278(23): 2075-9. PubMed PMID: 9403421.

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Cheung TC, et al. Diagnostic accuracy and reproducibility of the Ottawa knee rule vs the Pittsburgh decision rule. 2013; 31: 641-5. PubMed PMID: 23399332.

Parkland Fluids Formula for Burns

The Parkland Fluids Formula for Burns is a calculator used to determine a burn patient's fluid requirements, based on the patient's weight and percentage of body burned.

Input values

Single-choice selection and number input.

Criteria	Values
Units to use	Imperial units
	Metric units
Patient weight	Number input
Estimated percentage of body burned	Number input

Result values

The burn patient's fluid requirements are calculated via the following formulas:

```
First 24 hours = Patient weight in kg x percentage burned x 0.4
First 8 hours = (First 24 hours) / 2
```

If you enter the patient's weight in imperial units, it will be converted to metric units automatically, via the following formula:

```
kg = lbs * 0.45359237
```

Example output

```
Parkland Formula for Burns

Patient weight: 150 lbs
Estimated percentage of body burned: 16%

Fluid requirements, first 24: 4.4
Fluid requirements, first 8 (1/2 total): 2.2
```

References

Baxter CR. Fluid volume and electrolyte changes in the early post-burn period. Clin Plast Surg 1974;1:693-703. PubMed PMID: 4609676.

Cartotto RC, et. al. How Well Does The Parkland Formula Estimate Actual Fluid Resuscitation Volumes? Journal of Burn Care & Rehabilitation. 2002. Volume 23, Number 4. DOI: 10.1097/01.BCR.0000020449.78548.E0. PubMed PMID: 12142578.

PERC Rule for Pulmonary Embolism

The PERC Rule for Pulmonary Embolism is a calculator used to rule out pulmonary embolism in a patient.

Input values

Selection of the applicable criteria.

Criteria
Age < 50
Heart rate < 100
O2 sat on room air > 94%
No history of DVT or PE
No recent trauma or surgery
No hemoptysis
No exogenous estrogen
No clinical signs suggesting DVT

Result values

If all 8 criteria are selected, pulmonary embolism is ruled out in the patient.

Example output 1

```
PERC Rule for Pulmonary Embolism

Age < 50: Yes
Heart rate < 100: Yes
O2 sat on room air > 94%: Yes
No history of DVT or PE: Yes
No recent trauma or surgery: Yes
No hemoptysis: Yes
No exogenous estrogen: Yes
No clinical signs suggesting DVT: Yes

Less than 2% risk of PE in this patient, if clinician's pre-test probability is 15% or
less.
```

Example output 2

```
PERC Rule for Pulmonary Embolism

Age < 50: No
Heart rate < 100: No
```

```
O2 sat on room air > 94%: Yes
No history of DVT or PE: No
No recent trauma or surgery: No
No hemoptysis: No
No exogenous estrogen: Yes
No clinical signs suggesting DVT: No

PERC rule applies only if all 8 criteria are met.  PERC cannot be used to rule out PE in
this patient.
```

References

Kline JA, et al. Clinical criteria to prevent unnecessary diagnostic testing in emergency department patients with suspected pulmonary embolism. J Thromb Haemost 2004; 2: 1247-55. PubMed PMID: 15304025.

Kline JA, et al. Prospective multicenter evaluation of the pulmonary embolism rule-out criteria. J Thromb Haemost 2008; 6: 772-80. PubMed PMID: 18318689.

PSI/PORT Score: Pneumonia Severity Index for Adult CAP

The PSI/PORT Score is a score-based calculator used to determine the severity of adult community-acquired pneumonia in a patient.

Input values

Number input.

Criteria	Values	Score
Patient age	Number input	Equal to the number entered

Selection of the applicable criteria.

Criteria	Score
Female	10
Nursing home resident	10
Neoplastic disease history	30
Liver disease	20
Congestive heart failure	10
Cerebrovascular disease	10
Renal disease	10
Altered mental status	20
Respiratory rate over 29	20
Systolic blood pressure below 90	20
Temp below 35.0 deg C (95 deg F) or over 39.9 deg C (103.8 deg F)	15
Pulse over 124	10
pH below 7.35	30
BUN over 29	20
Sodium below 130	20
Glucose over 249 (US) or over 13.8 (SI)	10
Hematocrit below 30%	10
Partial pressure of oxygen below 60	10
Pleural effusion on X-ray	10

Result values

The individual scores are summed up to arrive at the PSI/PORT Score. This score is compared to the following table to determine the risk class:

Score	Risk class
Less than 51	Risk class I, 0.1-0.4% mortality
51 - 70	Risk class II, 0.6-0.7% mortality
71 - 90	Risk class III, 0.9-2.8% mortality
91 - 130	Risk class IV, > 2.8% mortality
Greater than 130	Risk class V, >> 2.8% mortality

Example output

```
PSI/PORT Score: Pneumonia Severity Index for Adult CAP

Patient age: 73 years
Female: Yes (-10 Points)
Nursing home resident: Yes (10 Points)
Neoplastic disease history: No (0 Points)
Liver disease: No (0 Points)
Congestive heart failure: No (0 Points)
Cerebrovascular disease: No (0 Points)
Renal disease: No (0 Points)
Altered mental status: No (0 Points)
Respiratory rate over 29: No (0 Points)
Systolic blood pressure below 90: No (0 Points)
Temp below 35.0 deg C (95 deg F) or over 39.9 deg C (103.8 deg F): No (0 Points)
Pulse over 124: No (0 Points)
pH below 7.35: No (0 Points)
BUN over 29: No (0 Points)
Sodium below 130: No (0 Points)
Glucose over 249 (US) or over 13.8 (SI): No (0 Points)
Hematocrit below 30%: No (0 Points)
Partial pressure of oxygen below 60: No (0 Points)
Pleural effusion on X-ray: No (0 Points)

Score: 73 points. Risk class III, 0.9-2.8% mortality.
```

References

Fine MJ. et. al. A prediction rule to identify low-risk patients with community-acquired pneumonia. N Engl J Med. 1997 Jan 23;336(4):243-50. PubMed PMID: 8995086.

Shah BA, et. al. Validity of Pneumonia Severity Index and CURB-65 Severity Scoring Systems in Community Acquired Pneumonia in an Indian Setting. The Indian Journal of Chest Diseases & Allied Sciences. 2010;Vol.52. PubMed PMID: 20364609.

Pregnancy Due Dates Calculator

The Pregnancy Due Dates Calculator is used to calculate pregnancy dates based on the last menstrual period (LMP), current gestational age or due date (EDC).

Input values

Single choice selection and number input.

Criteria			Values
Calculate pregnancy dates from:	LMP		Date selection
	Current gestational age	Weeks	Number input
		Days	
	Due date (EDC)		Date selection

Result values

The pregnancy dates are calculated from LMP via the following formulas:

```
Estimated due date = LMP + 294 days
Estimated gestational age = values below:
    Total days = Days between today and LMP date
    Weeks = Total days / 7
    Days = Remainder of (total days / 7)
Estimated date of conception = LMP + 14 days
```

The pregnancy dates are calculated from the current gestational age via the following formulas:

```
Estimated LMP = Today - ((weeks x 7) + days)
Estimated date of conception = Estimated LMP + 14 days
Estimated due date = Estimated LMP + 294 days
```

The pregnancy dates are calculated from EDC via the following formulas:

```
Estimated LMP = Due date (EDC) - 294 days
Estimated date of conception = Estimated LMP + 14 days
Estimated gestational age = values below:
    Total days = Days between today and estimated LMP
    Weeks = Total days / 7
    Days = Remainder of (total days / 7)
```

Example output 1

```
Pregnancy Due Dates

Last menstrual period: Mon Oct 12, 2015
Estimated gestational age: 3 weeks, 3/7 days
Estimated due date (40 weeks): Mon Aug 01, 2016
Estimated date of conception: Mon Oct 26, 2015
```

Example output 2

```
Pregnancy Due Dates

Current gestational age: 9 weeks, 5/7 days
Calculated last menstrual period: Sat Aug 29, 2015
Estimated due date (40 weeks): Sat Jun 18, 2016
Estimated date of conception: Sat Sep 12, 2015
```

Example output 3

```
Pregnancy Due Dates

Due date (EDC): Fri Feb 19, 2016
Estimated gestational age: 26 weeks, 6/7 days
Calculated last menstrual period: Fri May 01, 2015
Estimated date of conception: Fri May 15, 2015
```

References

Chervenak FA, Skupski DW, Romero R, et al: How accurate is fetal biometry in the assessment of fetal age?. Am J Obstet Gynecol 1998; 178:678. PubMed PMID: 9579429.

Shock Index Calculator

The Shock Index Calculator is used to determine a patient's shock index.

Input values

Number input.

Criteria	Values
Heart rate (bpm)	Number input
Systolic blood pressure (mmHg)	Number input

Result values

The patient's shock index is calculated via the following formula:

```
Shock index = Heart rate / Systolic blood pressure
```

Example output

```
Shock Index Calculator

Heart rate: 71 bpm
Systolic blood pressure: 121 mmHg

Shock index: 0.59
```

References

M. Allgöwer, C. Burri. The "shock-index". Dtsch med Wochenschr 1967; 92(43): 1947-1950. DOI: 10.1055/s-0028-1106070. PubMed PMID: 5299769.

Manuel Mutschler, Ulrike Nienaber, et. al. The Shock Index revisited – a fast guide to transfusion requirement? A retrospective analysis on 21,853 patients derived from the TraumaRegister DGU®. Critical Care 2013, 17:R172 doi:10.1186/cc12851. PubMed PMID: 23938104.

Cannon CM, Braxton CC, Kling-Smith M, Mahnken JD, Carlton E, Moncure M. Utility of the Shock Index in Predicting Mortality in Traumatically Injured Patients. J Trauma. 2009;67(6):1426-1430. PubMed PMID: 20009697.

Vandromme MJ, Griffin RL, Kerby JD, McGwin G Jr., Rue LW III, Weinberg JA. Identifying Risk for Massive Transfusion in the Relatively Normotensive Patient: Utility of the Prehospital Shock Index. J Trauma. 2011;70 (2):384-390. PubMed PMID: 21307738.

TIMI Risk Score for STEMI

The TIMI risk score for ST-elevation myocardial infarction (STEMI) is a score-based calculator used to determine an all-cause risk of 30-day mortality for patients with STEMI.

Input values

Single choice selection.

Patient's age	Score
Less than 64	0
64 to 74	2
Greater than 74	3

Selection of the applicable risk factors.

Risk factors	Score
DM or HTN or angina	1
SBP less than 100 mmHg	3
HR greater than 100 bpm	2
Killip class II to IV	2
Weight less than 67kg (147.7 lbs)	1
Anterior ST elevation or LBBB	1
Time to treatment greater than 4 hours	1

Result values

The individual scores are summed up to arrive at the TIMI risk score for STEMI for the patient. This score is compared to the following table to determine the risk percentage of 30-day mortality (all-cause):

Score	Risk percentage
0	0.8%
1	1.6%
2	2.2%
3	4.4%
4	7.3%
5	12.4%
6	16.1%
7	23.4%
8	26.8%
9 or more	35.9%

Example output

```
TIMI Risk Score for STEMI

Patient's age: 65 to 74 (2 Points)
DM or HTN or angina: Yes (1 Point)
SBP less than 100 mmHg: No (0 Points)
HR greater than 100 bpm: Yes (2 Points)
Killip class II to IV: No (0 Points)
Weight less than 67kg (147.7lbs): No (0 Points)
Anterior ST elevation or LBBB: Yes (1 Point)
Time to treatment greater than 4 hours: No (0 Points)

Total score: 6. 16.1% risk of 30-day mortality (all-cause).
```

References

David A. Morrow, et. al. TIMI Risk Score for ST-Elevation Myocardial Infarction: A Convenient, Bedside, Clinical Score for Risk Assessment at Presentation: An Intravenous nPA for Treatment of Infarcting Myocardium Early II Trial Substudy Circulation.2000; 102: 2031-2037 doi: 10.1161/01.CIR.102.17.2031. PubMed PMID: 11044416.

TIMI Risk Score for UA/NSTEMI

The TIMI risk score for unstable angina/non-ST-segment elevation myocardial infarction (UA/NSTEMI) is a score-based calculator creating a risk score for UA/NSTEMI patients.

Input values

Selection of the applicable criteria.

Criteria	Score
Age at least 65 years	1
At least 3 risk factors for CAD	1
Known CAD (stenosis at least 50%)	1
ASA use in past 7 days	1
Severe angina (at least 2 episodes in 24 hours)	1
ST changes greater than 0.5mm	1
Positive cardiac marker	1

Result values

The individual scores are summed up to arrive at the TIMI risk score for UA/NSTEMI for the patient. This score is compared to the following table to determine the risk percentage:

Score	Risk percentage
0-1	5%
2	8%
3	13%
4	20%
5	26%
6 or more	41%

Example output

```
TIMI Risk Score for UA/NSTEMI

Age at least 65 years: Yes
At least 3 risk factors for CAD: Yes
Known CAD (stenosis at least 50%): No
ASA use in past 7 days: No
Severe angina (at least 2 episodes in 24 hours): No
ST changes greater than 0.5mm: Yes
Positive cardiac marker: Yes
```

```
Total score: 4, 20% risk at 14 days including: all-cause mortality, new/recurrent MI,
severe recurrent ischemia requiring urgent revascularization.
```

References

Antman EM, Cohen M, et. al. The TIMI risk score for unstable angina/non-ST elevation MI: A method for prognostication and therapeutic decision making. JAMA. 2000 Aug 16;284(7):835-42.

Well's Criteria for Deep Vein Thrombosis

The Wells' Criteria for Deep Vein Thrombosis calculator is a score-based calculator used to determine a patient's risk for deep vein thrombosis (DVT).

Input values

Selection of the applicable criteria.

Criteria	Score
Cancer (active)	1
Bedridden recently more than 3 days, or major surgery within 4 weeks	1
Swelling of calf more than 3 cm compared to other leg	1
Collateral (nonvaricose) superficial veins present	1
Entire leg swollen	1
Localized tenderness along deep venous system	1
Pitting edema, greater in symptomatic leg	1
Paralysis, paresis, or recent plaster immobilization of lower extremity	1
Previous documented DVT	1
Alternative diagnosis to DVT as likely or more likely	-2

Result values

The individual scores are summed up to arrive at the Wells' Criteria for Deep Vein Thrombosis Score for the patient. This score is compared to the following table to determine the risk group:

Score	Risk group
0-1	Low risk group for DVT. "Unlikely" according to Wells' DVT Studies.
2 or greater	High risk group for DVT. "Likely" according to Wells' DVT Studies.

Example output

```
Wells' Criteria for Deep Vein Thrombosis

Cancer (active): No (0 Points)
Bedridden recently more than 3 days or major surgery within 4 weeks: Yes (1 Point)
Swelling of calf more than 3cm compared to other leg: Yes (1 Point)
Collateral (nonvaricose) superficial veins present: No (0 Points)
Entire leg swollen: No (0 Points)
Localized tenderness along deep venous system: No (0 Points)
Pitting edema, greater in symptomatic leg: Yes (1 Point)
Paralysis, paresis, or recent plaster immobilization of lower extremity: No (0 Points)
```

```
Previous documented DVT: Yes (1 Point)
Alternative diagnosis to DVT as likely or more likely: Yes (-2 Points)

2 points. High risk group for DVT. "Likely" according to Wells DVT Studies.
```

References

Wells PS, Anderson DR, Bormanis J, Guy F, Mitchell M, Gray L, Clement C, Robinson KS, Lewandowski B. Value of assessment of pretest probability of deep-vein thrombosis in clinical management. Lancet 350 (9094):1795-8. (1997)

Wells PS, Anderson DR, Rodger M, Forgie M, Kearon C, Dreyer J, Kovacs G, Mitchell M, Lewandowski B, Kovacs MJ. Evaluation of D-dimer in the diagnosis of suspected deep-vein thrombosis. N Engl J Med 349:1227-35. (2003)

Well's Criteria for Pulmonary Embolism

The Wells' Criteria for Pulmonary Embolism calculator is a score-based calculator used to determine a patient's risk for pulmonary embolism (PE).

Input values

Selection of the applicable criteria.

Criteria	Score
Clinical signs and symptoms of DVT	3
PE is #1 diagnosis, or equally likely	3
Heart rate over 100	1.5
Immobilization at least 3 days, or surgery in past 4 weeks	1.5
Previous, objectively diagnosed PE or DVT	1.5
Hemoptysis	1
Malignancy w/ treatment within 6 months, or palliative	1

Result values

The individual scores are summed up to arrive at the Wells' Criteria for Pulmonary Embolism Score for the patient. This score is compared to the following table to determine the risk group:

Score	Risk group
0-1.5	Low risk group: 1.3% chance of PE (*Wells PS). Or PE unlikely, 3% incidence (*Wolf SJ).
2-4	Mod risk group: 16.2% chance of PE (*Wells PS). Or PE unlikely, 3% incidence (*Wolf SJ).
4.5-6	Mod risk group: 16.2% chance of PE (*Wells PS). Or PE likely, 28% incidence (*Wolf SJ).
6.5 or greater	High risk group: 40.6% chance of PE (*Wells PS). Or PE likely, 28% incidence (*Wolf SJ).

Example output

```
Wells' Criteria for Pulmonary Embolism

Clinical signs and symptoms of DVT: Yes (3 Points)
PE is #1 diagnosis, or equally likely: No (0 Points)
Heart rate over 100: Yes (1.5 Points)
Immobilization at least 3 days, or surgery in past 4 weeks: No (0 Points)
Previous, objectively diagnosed PE or DVT: No (0 Points)
Hemoptysis: Yes (1 Point)
Malignancy w/ treatment within 6 mo, or palliative: No (0 Points)

5.5 points. Mod risk group: 16.2% chance PE (*Wells PS). Or PE likely, 28% incidence
(*Wolf SJ).
```

References

Wells PS, Anderson DR, Rodger M, Stiell I, Dreyer JF, Barnes D, Forgie M, Kovacs G, Ward J, Kovacs MJ. Excluding pulmonary embolism at the bedside without diagnostic imaging: management of patients with suspected pulmonary embolism presenting to the emergency department by using a simple clinical model and d-dimer. Ann Intern Med. 2001 Jul 17;135(2):98-107. PubMed PMID: 11453709.

Wolf SJ, McCubbin TR, Feldhaus KM, Faragher JP, Adcock DM. Prospective validation of Wells Criteria in the evaluation of patients with suspected pulmonary embolism. Ann Emerg Med. 2004 Nov;44(5):503-10. PubMed PMID: 15520710.

Westley Croup Score

The Westley Croup Score is a score-based calculator used in a research setting to determine croup severity in a patient.

Input values

Single choice selection for each clinical sign.

Clinical sign	Value	Score
Retractions of chest wall	None	0
	Mild	1
	Moderate	2
	Severe	3
Stridor	None	0
	With agitation	1
	At rest	2
Cyanosis	None	0
	With agitation	4
	At rest	5
Level of consciousness	Normal	0
	Disoriented	5
Air entry	Normal	0
	Decreased	1
	Markedly decreased	2

Result values

The individual scores are summed up to arrive at the Westley Croup Score. The following levels of severity are defined:

Score	Severity
0-2	Croup severity mild.
3-5	Croup severity moderate.
6-11	Severe croup; admission recommended.
12 or greater	Impending respiratory failure; patient may require intubation.

Example output

```
Westley Croup Score

Retractions of chest wall: Mild (1 points)
Stridor: None (0 points)
Cyanosis: With agitation (4 points)
Level of consciousness: Normal (0 points)
Air entry: Normal (0 points)

Westley Croup Score: 5. Croup severity moderate.
```

References

Westley CR, Cotton EK, Brooks JG. Nebulized racemic epinephrine by IPPB for the treatment of croup: a double-blind study. Am J Dis Child. 1978 May;132(5):484-7.

Klassen TP (December 1999). \"Croup. A current perspective\". Pediatr. Clin. North Am. 46 (6): 1167-78. doi:10.1016/S0031-3955(05)70180-2. PMID 10629679.

Super DM, et al. A Prospective Randomized Double-Blind Study to Evaluate the Effect of Dexamethasone in Acute Laryngotracheitis. J Pediatr. 1989; 115: 323-9.