
SPEA-V348 Management Science · Week 2 review

Probability, and expected value

Both sessions, every slide, fully revealed. Read it without me in the room.

Mon Aug 31 and Wed Sep 2, 2026

The week at a glance

Mon Aug 31	Multiply for “and”, add and subtract the overlap for “or”, then read a two-way table for joint, marginal, and conditional
Wed Sep 2	Expected value, netting a cost out of it, variance and standard deviation, and a first look at Bayes
Reading	Taylor 13e, Chapter 11, pp. 539 to 553, skipping the binomial on pp. 545 to 547
Due	The Week 2 workbook, on Canvas. Tier 1: AI as a tool, with disclosure

ON THE SITE · the Week 2 page

The three widgets, the two self-checks, and the workbook download all live here.

v348.jima.me/week/w02/

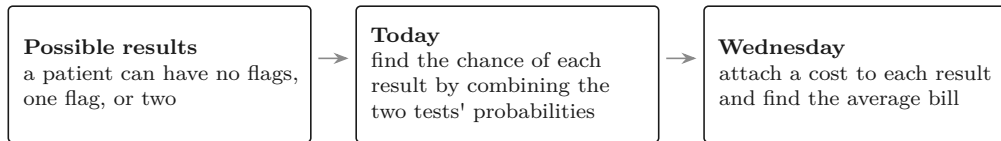


Session 1

Mon Aug 31

Combining chances, then comparing costs

The clinic needs probabilities for each possible test result



*Two sessions, two halves: today you learn to **combine** chances, Wednesday to **compare** options with them.*

The clinic's two screens

The question this session answers

PUZZLE

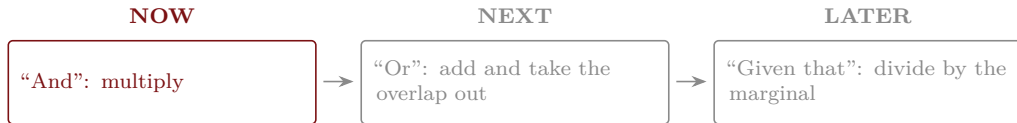
A walk-in clinic runs **two independent** screening tests on every patient. Test A flags a problem with probability 0.15; test B flags one with probability 0.10.

What is the chance both tests flag the same patient? And the chance at least one does?

Those two questions sound alike and use opposite rules. Keeping them straight is the whole skill.

Where we are

Three rules today, in this order



The puzzle's first question is an "and" and its second is an "or". The third rule answers what the clinic most wants to know about a flag: given one, how likely is the problem?

Three words, then the rules

Experiment

a repeatable process with an uncertain result: screening one patient

Event

the outcome whose chance you want: “A flags”, “both flag”

Independent

one happening tells you nothing about the other

Independence is an assumption about the two tests, and it is what makes the next slide legal.

Taylor 13e, pp. 539 to 545. The names “multiplication rule” and “addition rule” are ours; the book states both without labelling them.

“And”, in symbols

The multiplication rule, for independent events

$$P(A \cap B) = P(A) \times P(B)$$

The first chance: test A flags.
Here $P(A) = 0.15$

The second chance, unchanged
by the first. That is what independent buys you. Here 0.10

The product: both, and it is
always smaller than either

$0.15 \times 0.10 = 0.015$, about one patient in 67. Requiring several independent things at once is hard, which is why “and” probabilities are small.

One patient, four outcomes

The rule prices every one, not just the one you asked about

Result of screening one patient	Chance	
Neither flags	0.85×0.90	0.765
Only A flags	0.15×0.90	0.135
Only B flags	0.85×0.10	0.085
Both flag	0.15×0.10	0.015
All four together		1.000

Four shares, on your laptop

The table you just read, run on live patients

IN CLASS

Open the widget on the Week 2 page and drop patients through it. Watch the four shares settle onto 0.765, 0.135, 0.085 and 0.015 as the count grows. The table is the long run; any short run misses it.

ON THE SITE · the four-outcome widget

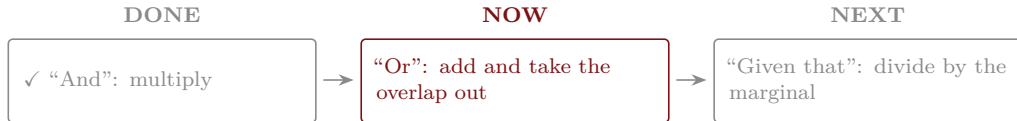
The four outcomes cover everything one patient can do, which is what the **1.000** checks.

v348.jima.me/week/w02/



Where we are

One rule down, two to go



You can price “both” at 0.015, and you have all four things one patient can do, adding to 1. “At least one” asks a different question of the same four rows.

“At least one”, read off the four outcomes

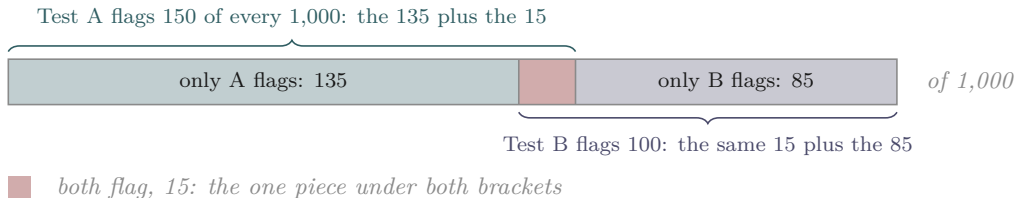
You already have the answer; the rule is a shortcut to it

Result of screening one patient	Chance	
Neither flags	0.85×0.90	0.765
Only A flags	0.15×0.90	0.135
Only B flags	0.85×0.10	0.085
Both flag	0.15×0.10	0.015
At least one flags: only A, only B, both		0.235

“At least one” is three of the four rows. The row it leaves out, “neither”, is the one to hold on to.

Why the rule subtracts

The same 235 patients, counted the way each test counts them



Add the two brackets and the 15 are in there twice: $150 + 100 = 250$. Count the patients and they are there once: $135 + 15 + 85 = \mathbf{235}$. Taking them out once is the whole rule.

“Or”, in symbols

The addition rule, now that you have seen what the third term is

Everyone A flagged, 150 in 1,000: 0.15. The 15 double-flags are in it

Everyone B flagged, 100 in 1,000: 0.10. The same 15 are in it too

The 15, taken out once: they were counted twice, so subtract 0.015

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$0.15 + 0.10 - 0.015 = 0.235$, the three rows of the table. Taylor 13e, pp. 541 to 544.

The same count, on a week of patients

400 patients at the clinic's rates, on your laptop

IN CLASS

Open the marked-grid widget. It holds a week's 400 patients: test A flags 60, test B flags 40, and 6 are flagged by both. Mark test A's flags, then test B's, and say how many squares carry a mark before you press the third button.

ON THE SITE · the marked-grid widget

Press the third button only after you have said your number.

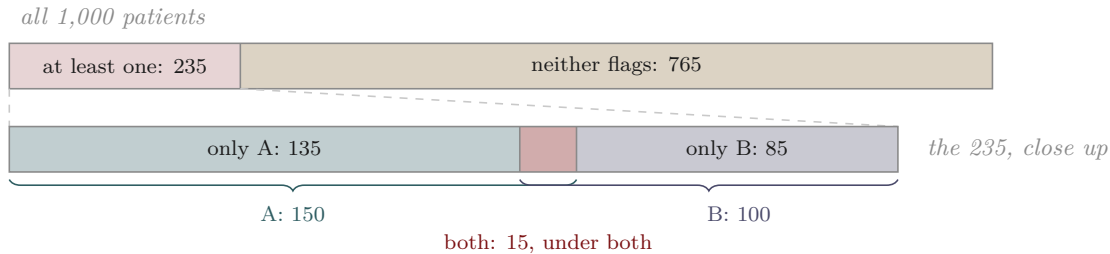
v348.jima.me/week/w02/

$60 + 40 = 100$ marks, but only **94** marked squares. The 6 marked twice are the overlap: $94/400 = 0.235$.



Two routes to “at least one”

Add the brackets and take the overlap out, or take “neither” off the whole



Route 1, on the close-up. Add the two brackets and take the 15 out once:
 $0.15 + 0.10 - 0.015 = \mathbf{0.235}$.

Route 2, on the whole bar. “Neither” is the fourth row, a plain “and”,
 $0.85 \times 0.90 = 0.765$. Everything else is at least one: $1 - 0.765 = \mathbf{0.235}$. When a question says **at least one**, this is usually the shorter road.

Mutually exclusive is not independent

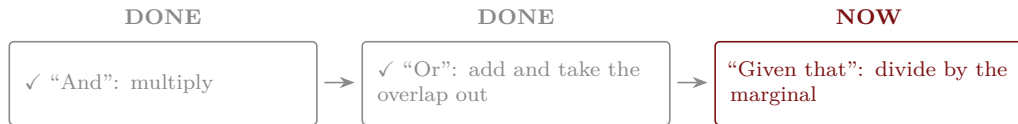
Zero overlap is the opposite of telling you nothing

	Mutually exclusive	Independent
What it says	They cannot both happen, so $P(A \cap B) = 0$ and the overlap term vanishes	One tells you nothing about the other
One patient, two rows of the table	“Only A flags” or “both flag”: a patient lands in exactly one row, so $0.135 + 0.015 = 0.15$ with no overlap to remove	Not independent at all: a patient in the “only A” row cannot be in the “both” row

*If one happening forces the other not to happen, learning the first changed the second's chance to **zero**. That is the opposite of telling you nothing. The two tests, by contrast, are independent and their rows overlap: 0.015, not 0.*

Where we are

Two rules down, one to go



Multiply for “and”: 0.015. Add and take the overlap out for “or”, or flip to the complement: 0.235 either way. The last rule needs something the two flag rates cannot give you: a second fact about each patient, found out later.

The four outcomes were already a table

Rows for one test, columns for the other, and the totals on the edges

	B flags	B does not	Row total
A flags	0.015	0.135	$P(A) = 0.15$
A does not	0.085	0.765	0.85
	$P(B) = 0.10$	0.90	1.00

*Every inside cell is its row total times its column total: $0.15 \times 0.10 = 0.015$. That is what **independent** looks like in a table. Keep the test: the clinic's next table is data, and nothing promises it passes.*

A table starts life as counts

The week's 400 patients, followed up: does test A's flag mean the problem?

Each screen looks for a different problem, so take test A's. Of the 400 patients, **32** turned out to have it. Test A had flagged 24 of those 32, and 36 of the 368 without it.

	Flag	No flag	Row total
Has the problem	24	8	32
No problem	36	332	368
Column total	60	340	400

*Data arrives as counts, never as probabilities. Build the table first, then **divide by 400** at the very end. Test A flags 60 of the 400: the same 0.15.*

The same table, on a 0-to-1 scale

Inside cells are joint; the edges are marginal

	Flag	No flag	Row total
Has the problem	0.06	0.02	$P(\text{problem}) = 0.08$
No problem	0.09	0.83	0.92
	$P(\text{flag}) = 0.15$	0.85	1.00

$P(\text{problem} \cap \text{flag}) = 24/400 = \mathbf{0.06}$ is a **joint** probability. Sum a row or a column and the answer is a **marginal**: $P(\text{problem}) = 0.06 + 0.02 = 0.08$, the **base rate**, before any test has spoken.

Conditional probability, in symbols

What changes is the denominator

$$P(A \mid B) = \frac{P(A \cap B)}{P(B)}$$

On top: the joint, the cases where both are true. Here $P(\text{problem} \cap \text{flag}) = 0.06$

Underneath: the marginal, the world you have just been told you are in. Here $P(\text{flag}) = 0.15$

The ratio: the same cases, re-based on that smaller world

Taylor 13e, pp. 547 to 550. Week 6 uses conditional probability to revise a belief when evidence arrives, and hangs the result on Week 5's decision trees.

What conditioning actually did

Among flagged patients, how likely is the problem?

$$P(\text{problem} \mid \text{flag}) = \frac{P(\text{problem} \cap \text{flag})}{P(\text{flag})} = \frac{0.06}{0.15} = \frac{24}{60} = 0.40$$

- Read it in counts and you can see the move: the 340 patients test A did not flag are **thrown away**, and the question is re-based on the 60 it did. The denominator went from 400 to 60.
- 0.40 against the base rate 0.08: **dependent**, since independent would have left it at 0.08. The cell test agrees: $0.15 \times 0.08 = 0.012$, not 0.06.

ON THE SITE · the two-way table

Both tables, the counts and the probabilities, with every cell worked.

v348.jima.me/week/w02/



Where a probability comes from

Three kinds, and the label tells you how much to trust it

Classical

counted from equally likely outcomes, like a die

Relative frequency

the share seen in past data.
The most common kind in business

Subjective

an informed expert's degree of belief

*The clinic's 0.15 and 0.10 are **relative frequencies** from past patients, so they carry sampling error. A rule applied to a shaky input gives a shaky answer.*

In practice: independence is an assumption

IN PRACTICE

It is usually assumed because it is convenient, not because it is true.

Two medical tests can share a failure mode and be fooled by the same thing; two loans can default together in the same recession. Assume independence there and you *understate* the chance of a joint bad outcome.

Watch the wording. “And”, “or”, “at least one” and “given that” point at different rules. Mis-reading the question, not the arithmetic, is the usual source of a wrong probability.

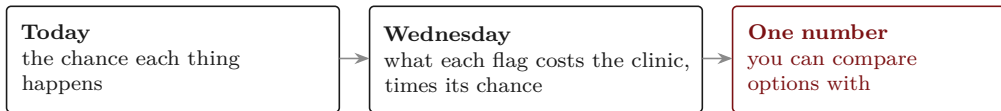
Name the assumption out loud when you use it. It is the first thing a reviewer will go after.

Back to the clinic

- Both screens flag the same patient with probability $0.15 \times 0.10 = \mathbf{0.015}$, about one patient in 67.
- At least one flags with probability $0.15 + 0.10 - 0.015 = \mathbf{0.235}$, roughly **one patient in four**: staff for those follow-ups, not for the rare double flag.
- A flag is a reason to look, not a verdict: of the 60 patients test A flagged, 24 had the problem, $P(\text{problem} \mid \text{flag}) = \mathbf{0.40}$.

Multiply for “and”. Add and take the overlap out for “or”, or flip to the complement. Divide by the marginal for “given that”.

Wednesday



*Multiply each possible bill by its **probability**, then add: that is **expected value**. Wednesday uses it to price the clinic's follow-up visits.*

Group practice

Fifteen minutes, with your group

IN CLASS

A campus food pantry logged all 500 visits last month, by visitor type and by whether they booked online. Build the table, read three kinds of probability off it, test whether booking is independent of visitor type, and answer one “at least one” question twice. **Every member’s name goes on the sheet**, then one of you photographs it and **uploads the photo to Canvas** before you leave. One participation point, half today’s attendance record.

ON THE SITE · Week 2 practice sheet

The same sheet is on the site if your group wants it on a screen as well as on paper.

v348.jima.me/assets/docx/v348-w02-s1-group-practice.docx



Photograph your attempt, then check it together

Two minutes to capture your work; eight for the instructor's demonstration

IN CLASS

Check every member's name and photograph your group's own attempt before the solution is shown. One member uploads the photo to Canvas by the end of class.

We close by checking the method, the main results with units, and a common mistake. Participation credit is for attempting the work.

Session 2

Wed Sep 2

Monday's sheet, the last two cells

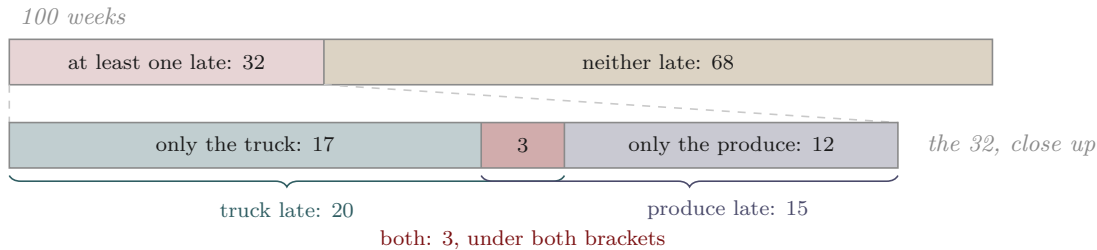
Two deliveries a week, late with probability 0.20 and 0.15, independent

One week's deliveries	Chance	
Neither late	0.80×0.85	0.68
Only the truck late	0.20×0.85	0.17
Only the produce late	0.80×0.15	0.12
Both late	0.20×0.15	0.03
At least one late: the three rows with a late in them		0.32

Same move as the clinic: price all four things a week can do, and “at least one” is three of the rows. The fourth row, “neither”, is the one both routes on the next frame turn on.

The same two routes, on the picture

Add the brackets and take the overlap out, or take “neither” off the whole



Addition rule, on the close-up. Add the two brackets and take the 3 out once:
 $0.20 + 0.15 - 0.03 = 0.32$.

Via the opposite, on the whole bar. “Neither” is a plain “and”,
 $0.80 \times 0.85 = 0.68$. Everything else is at least one: $1 - 0.68 = 0.32$. The two cells had better agree, and they do.

The clinic's follow-up bill

The question this session answers

PUZZLE

Monday's clinic, Monday's two screens: test A flags a patient with probability 0.15, test B with 0.10, independently. Every flag sends the patient to a follow-up visit that costs the clinic **\$40**.

A lab offers to handle every follow-up for a flat **\$12 per patient screened**, whatever the screens find.

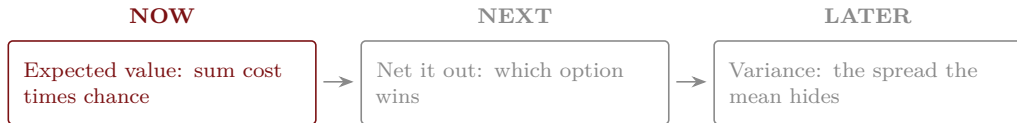
Should the clinic take the lab's offer, or keep paying \$40 a visit?

“A patient can cost \$80” is true and beside the point. So is “most patients cost nothing”.

*You need a number that holds **every** outcome and its chance at once.*

Where we are

Three blocks today, in this order



“Take the lab’s offer?” takes two blocks: the first turns the three bills and their odds into one number, the second nets the \$12 fee out of it. The third asks what that one number hides.

Expected value, in symbols

Multiply each possible bill by its probability, then add

$$E[X] = \sum_i x_i p_i$$

What each outcome is worth:

here, what it costs the clinic in dollars. \$0, \$40, \$80

How likely it is, summing to 1:

Monday's rows, the two one-flag rows merged. 0.765, 0.22, 0.015

The total: the long-run average, not the likeliest outcome and not the worst one

Taylor 13e, pp. 551 to 553. The clinic's possible bills are weighted by their probabilities.

What one patient costs

One row per bill: cost times probability

Flags on the patient	Cost x_i	Chance p_i	$x_i p_i$
Neither	\$0	0.765	\$0.00
Exactly one	\$40	0.22	\$8.80
Both	\$80	0.015	\$1.20
Every patient		1.000	\$10.00

*An average patient costs **\$10** in follow-ups, a bill no patient ever runs up: the whole spread of outcomes, in one number.*

Monday's grid, priced

An expected count is the number of tries times the chance per try

Whether both tests flag a patient is a 0-or-1 outcome whose expected value is just its chance. A week's 400 patients carry $400 \times 0.015 = \mathbf{6}$ expected double flags: that is where the grid's 6 came from, and its 60 and 40.

100

marks on the grid, $60 + 40$:
every mark is a \$40 visit

\$4,000

the week's follow-up bill,
 $100 \times \$40$

\$10

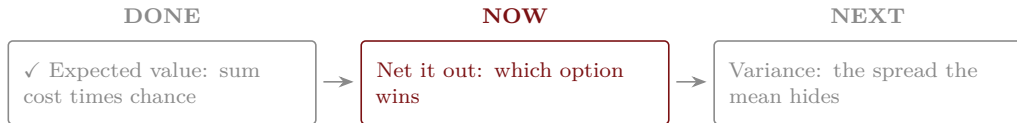
a patient, $\$4,000/400$: the
same number

The 6 patients marked twice, whom the addition rule counted once, are **two visits each** on the bill. The bill counts marks, not patients.

Week 2 page, Session 2, Build the skill 1. The take-home turns on the same move.

Where we are

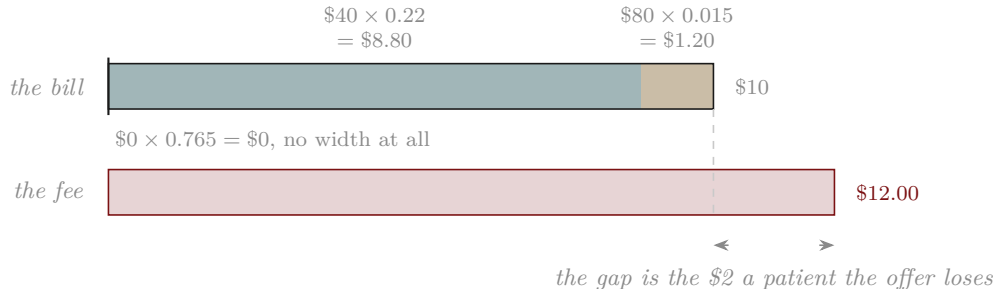
One block down, two to go



You can price a patient at \$10, the three bills and their odds in one number. On its own that does not say whether to take the lab's offer: the lab charges \$12, and nothing has been compared with anything yet.

What the offer takes over, against what it costs

Every piece is a bill times its own probability



ON THE SITE · the two-bar widget

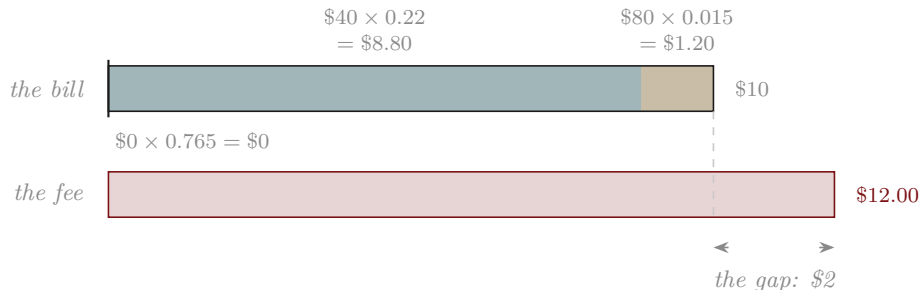
Step through the pieces one at a time and watch the gap open.

v348.jima.me/week/w02/



Now net out the fee

The gap between the two bar ends, as a number



$$E[\text{net}] = E[\text{bill taken over}] - \text{fee} = 10 - 12 = -\$2$$

*“Take the offer” scores $-\$2$ a patient and “keep paying per visit” scores $\$0$, so **keep paying per visit** wins. Comparing options is nothing more than that, and Weeks 4 to 6 are built on it.*

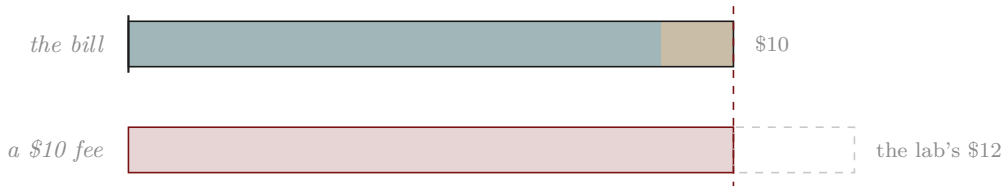
Two pieces of that bar are worth a second look

- The **\$0 outcome has no width at all**, even though it is what happens to 76.5% of patients. An outcome worth nothing contributes nothing, however likely it is.
- The **\$80 double flag adds only \$1.20**: twice the bill of one flag at about a fifteenth of the chance, so its piece is less than a seventh as wide as the one-flag piece.

That is what “a patient can cost \$80” is worth once you price it properly.

The most the offer is worth

Turn the comparison round and it prices the offer



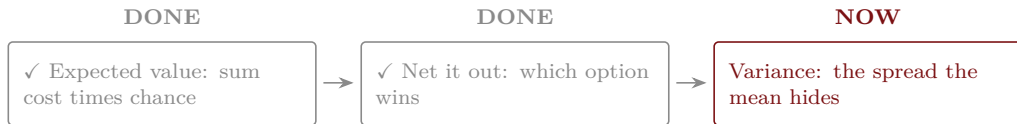
the two ends meet: the gap is \$0

At a fee of \$10 “take the offer” would score exactly \$0. Above it, keep paying per visit; below it, sign.

\$10 a patient is the most the offer is worth: the fee at which the clinic would not care either way. The take-home asks the same of a service contract.

Where we are

Two blocks down, one to go



Against the lab's \$12, paying per visit saves \$2 a patient on average, and \$10 is the most the offer is worth: an expected value settled the decision. Nothing so far says how far one patient's bill can land from \$10.

Expected value has a partner

Variance, and why the centre is not the whole story

$$\text{Var}(X) = \sum_i (x_i - E[X])^2 p_i$$

How far off each outcome is, squared so a miss either way counts. No flag: 0 – 10

Weighted by its chance, exactly as the mean was. Here by 0.765

Square-root it and you are back in the units of x , dollars here: the standard deviation

Spread is what the word *risk* means. Taylor 13e, pp. 551 to 553.

Run the spread by hand

The same three bills, measured from the \$10 centre

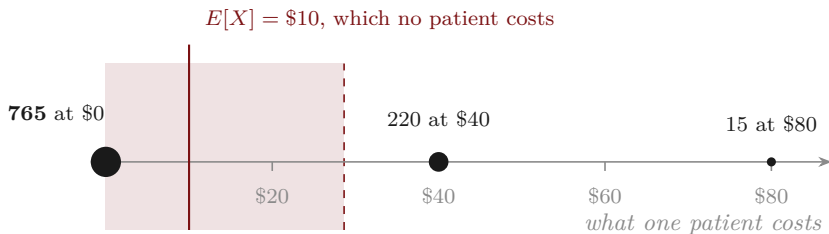
x	p	$x - E[x]$	$(x - E[x])^2$	$(x - E[x])^2 p$
\$0	0.765	-10	100	76.5
\$40	0.22	30	900	198
\$80	0.015	70	4,900	73.5
Var(x)				348

The centre you already have: $E[x] = \text{\textcolor{red}{\$10}}$. Every “how far off” in the table is measured from it: a patient with no flag lands \$10 short, a double flag \$70 over.

Sum the last column and take the root: $SD(x) = \sqrt{348} \approx \text{\textcolor{red}{\$18.65}}$. The double flag is 1.5% of patients and a fifth of that sum.

What \$10 and \$18.65 look like

One thousand patients, placed by what they cost



one SD either side: the right edge is \$28.65, and the left runs below \$0

765 of the 1,000 sit inside that band, and the **235** outside it supply **78%** of the variance. The centre is where the money settles over many patients; the spread is how far one patient's bill can miss it.

What \$18.65 does and does not say

The picture showed you where the patients are; this is how to read the number

- The units are **dollars**, which is what makes the SD readable. The 348 it came from is in *squared dollars* and is not.
- It is *not* a boundary and not what a typical patient does: no patient costs \$10, and \$10 less \$18.65 is below zero, which no bill ever is.
- Put a price on a count and both scale. The bill is a count of visits times \$40: the count's mean, 0.25, and its SD scale by 40, to \$10 and \$18.65, while its variance, 0.2175, scales by $40^2 = 1,600$, to 348.

The lab's \$12 has no spread at all; paying per visit is \$2 cheaper on average and swings. A manager who hates surprises will not treat those as equal.

The same arithmetic, a public budget

Snow-response overtime, one week ahead: the centre, then how far a week misses it

Week	Cost	Chance	Cost $\times$ chance	Miss	Miss ² $\times$ chance
Ordinary	\$4,000	0.80	\$3,200	-\$2,800	6,272,000
Major storm	\$18,000	0.20	\$3,600	\$11,200	25,088,000
Expected overtime			\$6,800	Var	31,360,000

Square-root it and you are back in dollars: $SD = \sqrt{31,360,000} = \text{\$5,600}$ a week.

*\$6,800 is a defensible **long-run budget** per week, and \$5,600 is how far a week can land from it. No week ever costs \$6,800: the centre sets the budget and the spread sets the reserve.*

In practice: what expected value leaves out

IN PRACTICE

It says nothing about spread. A small certain cost and a rare huge one can carry the same expected value and feel nothing alike. The spread you just computed, \$18.65 on a \$10 centre, is how we measure that difference.

One patient is not the long run, but a week can be. A week's 400 independent patients average \$4,000 with an SD of only about \$373, against the lab's certain \$4,800. An outbreak that moves everyone's flags together breaks that: independence is what paying per visit bets on.

Garbage in, garbage out. The \$2 margin is thin: at a test A rate of 0.20 instead of 0.15, the bill averages $40 \times 0.30 = \$12$ and the offer ties.

*Report the expected value **and** the spread. One without the other is half an answer.*

Back to the clinic

- One patient's follow-ups average **\$10**; the lab charges \$12, so taking the offer nets **-\$2** a patient. Keep paying \$40 a visit.
- Turned round, \$10 is the **most the offer is worth**: price it there and the two options tie.
- The spread does not overturn it: a week of 400 independent patients totals about \$4,000, give or take \$373, against a certain \$4,800. Revisit it in an outbreak, or if test A's rate creeps toward 0.20.
- The lab would also schedule the visits, and staff time sits on neither bar. If that time is worth more than \$2 a patient, the offer wins on a number this model never priced.

Naming what a model leaves out is part of using it, not an apology for it.

Where this is heading

Monday's follow-up table, read the other way round

Monday's table held all 400 patients, the truth about each one included. A test's maker publishes something else: its **track record**, the conditional the other way round.

$$P(\text{flag} \mid \text{problem}) = \frac{24}{32} = 0.75$$

$$P(\text{problem} \mid \text{flag}) = \frac{24}{60} = \mathbf{0.40}$$

Same 24 patients, different denominator: 0.75 is how often the test catches the problem, 0.40 is how often a flag is right. The base rate times the track record rebuilds the joint, $0.08 \times 0.75 = 0.06$.

*Turning the 0.75 a maker publishes into the 0.40 a flagged patient needs, a prior of 0.08 moved to a posterior of 0.40, is **Bayes' rule**. Week 6 does it properly.*

This week's take-home

One file, on Canvas, by Sunday at 11:59 PM

- A term of **shuttle trip logs** and dispatch's record of call-outs. You turn the log into a two-way table and test whether the two routes really fail independently.
- Nothing arrives on the basis the manager decides on: the contract is priced by the year for a decision taken by the month. **Convert first, compare second.** An expected count is the number of tries times the chance per try: a week's 400 patients carry $400 \times 0.015 = 6$ expected double flags. Then the workbook turns the question round and asks what the cover is *worth*, not what it costs.

ON THE SITE · the brief and the workbook

Download the workbook here. **Tier 1:** AI as a tool, with the disclosure cell filled in.

v348.jima.me/week/w02/



Carry into Week 3

$$E[X] = \sum x_i p_i$$

payoff times chance,
added up

net it out

compare options on one
number

Var, SD

the spread the mean
hides

$$P(A \mid B)$$

where the information
lives

*Next week the probabilities are **taken away**. With nothing but a table of payoffs you still have to choose, and the rule you choose by is a statement about how much downside you can absorb.*

Review

Week 2

Can you define these without looking?

experiment	event	probability	random variable
independent	mutually exclusive	dependent events	multiplication rule
addition rule	complement rule	joint probability	marginal probability
conditional probability	probability distribution	expected value	variance and SD

ON THE SITE · Key Concepts

Every one of these has a one-line definition and a worked example behind it. Filter by week.

v348.jima.me/concepts/



Definitions: combining chances

Experiment, event	A repeatable process with an uncertain result, and the outcome whose chance you want
Independent	One happening tells you nothing about the other
Mutually exclusive	They cannot both happen, so $P(A \cap B) = 0$. Not the same as independent
Multiplication rule	$P(A \cap B) = P(A)P(B)$ for independent events
Addition rule	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
Complement rule	$P(\text{at least one}) = 1 - P(\text{none})$

Definitions: reading a table, and pricing a spread

Joint probability	An inside cell: both things true at once
Marginal probability	A row or column total: one thing on its own
Conditional probability	$P(A B) = P(A \cap B)/P(B)$: the same cases, re-based on a smaller world
Random variable	A quantity whose value is decided by an uncertain outcome
Expected value	$E[X] = \sum_i x_i p_i$: the long-run average
Variance, SD	$\text{Var}(X) = \sum_i (x_i - E[X])^2 p_i$, and its square root, in the units of x

Test yourself

If one of these is slow, that is where to reread

1. Two events have $P(A) = 0.4$ and $P(B) = 0.3$. What is $P(A \cup B)$ if they are mutually exclusive, and if they are independent? Why do the answers differ?
2. A table's inside cell reads 0.12 and its row total reads 0.30. Which of those is joint and which is marginal, and what is the conditional probability you can build from them?
3. Why does a \$0 outcome contribute nothing to an expected value even when it is the likeliest one?
4. Two projects both have $E = \$50,000$. One has $SD = \$2,000$, the other \$40,000. What question would you ask before choosing?
5. You are told $P(A | B) = P(A)$. What does that tell you about A and B ?

Numbers worth remembering

0.015

both screens flag,
 0.15×0.10

0.235

at least one flags, two
ways

\$10

one patient's expected
follow-up bill

−\$2

the lab's offer, net of
its \$12 fee

Question	Rule	Worked this week
Both, for independent events	multiply	$0.15 \times 0.10 = 0.015$
At least one	add, less the overlap	0.235, or $1 - P(\text{neither})$
Given that	divide by the marginal	$P(\text{problem} \mid \text{flag}) = 0.40$

Carry into Week 3

- Week 3 **takes the probabilities away**. You get a table of payoffs and nothing to weight them with, which is a different problem, not a harder version of this one.
- What replaces them is a **criterion**: a stated rule about how much downside you are willing to carry. Five of them, and they disagree.
- Everything from this week comes back in Week 4, when the probabilities return and expected value decides between whole strategies.

ON THE SITE · Week 3

Monday Sep 7 is Labor Day, so Week 3 is Wednesday only. The reading is short.

v348.jima.me/week/w03/

