



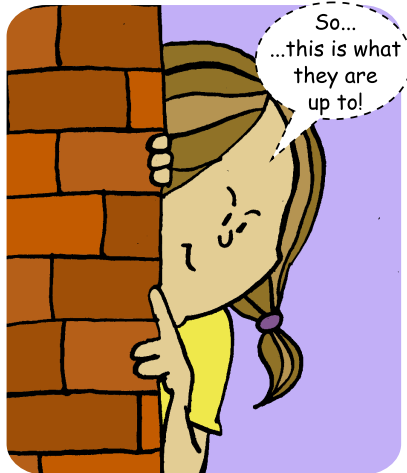
### Veteran Epidemiologist

Keep this card. Once per game, you may roll two dice instead of one. Pick one die. Discard after use.



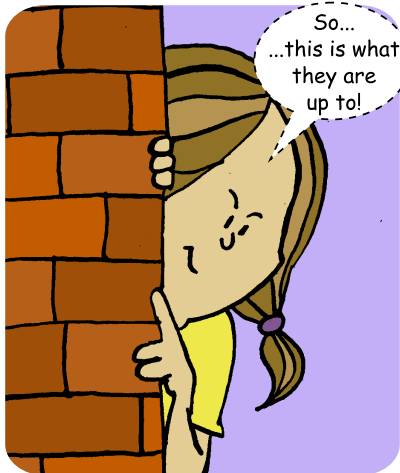
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### Espionage

Keep this card. One player of your choice has to show you all his event cards and you may draw another event card. Discard after use.



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### Interview

Play immediately. Choose one player, including yourself. That player gets interviewed and rolls a die, adding +1 for each of his reasearch cards.  
1-2: One of your detectives misses one turn  
3-5: The interview was ok.  
6+: Terrific! You convinced the public that the investigation is in the best hands possible. Keep this card and play it for a reroll.



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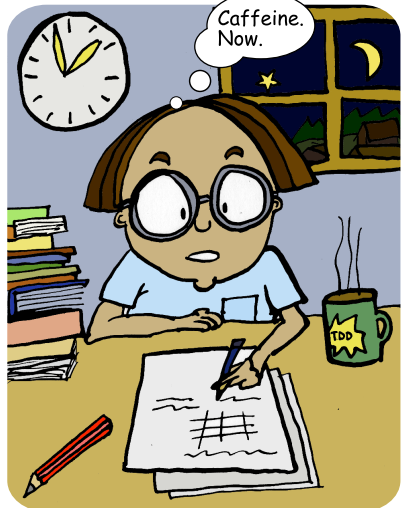
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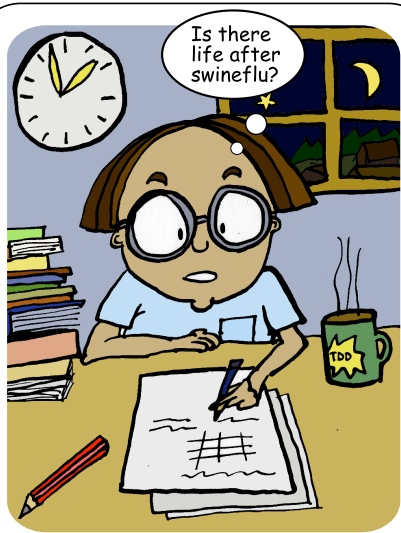
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6+: Terrific! You convinced the public that the investigation is in the best hands possible. Keep this card and play it for a reroll.



### Michaels Nightshift

Keep this card. If Michael does a research action he may add two research points instead of one. Discard after use.



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Keep this card. If Michael does a research action he may add two research points instead of one. Discard after use.



### Thomas' Sprint

Keep this card. Thomas may walk up to 9 fields instead of 6. Discard after use.



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Keep this card. Thomas may walk up to 9 fields instead of 6. Discard after use.



### Lucy's HQ

Keep this card. Lucy may skip her turn and allow another disease detective in her team to take another turn. This may be a research action. Discard after use.



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Keep this card. Lucy may skip her turn and allow another disease detective in her team to take another turn. This may be a research action. Discard after use.



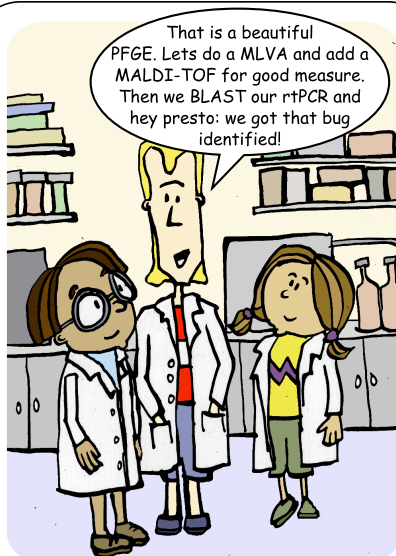
### Communication Training

Keep this card. If rolling for interview cards, you may add two to your roll. Discard after use.



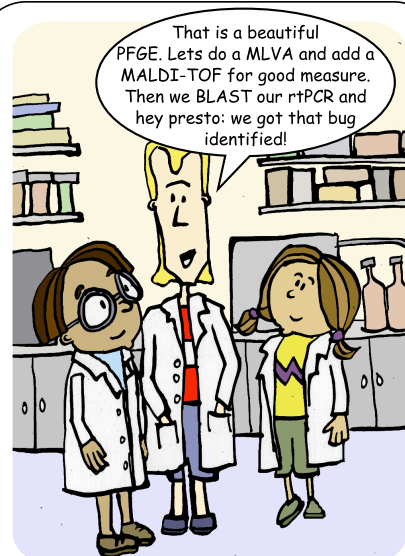
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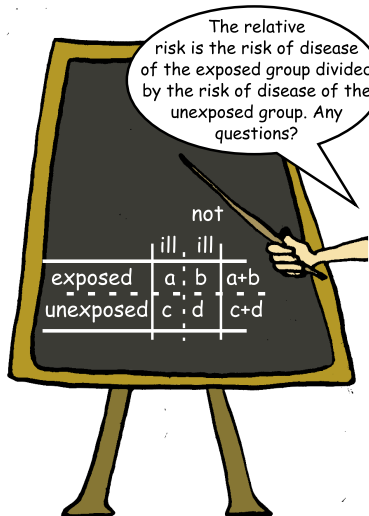
### Lab Training

Keep this card. If rolling for lab research, you may reroll your die. Discard after use.



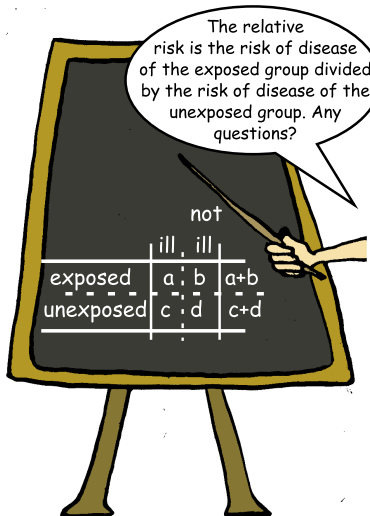
### Lab Training

Keep this card. If rolling for lab research, you may reroll your die. Discard after use.



### Stats Training

Keep this card. If rolling for epidemiology research, you may reroll your die. Discard after use.



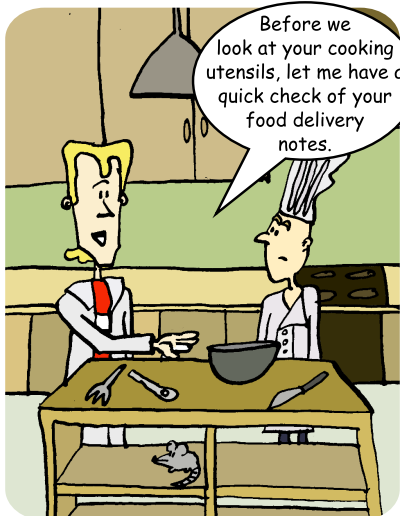
### Stats Training

Keep this card. If rolling for epidemiology research, you may reroll your die. Discard after use.



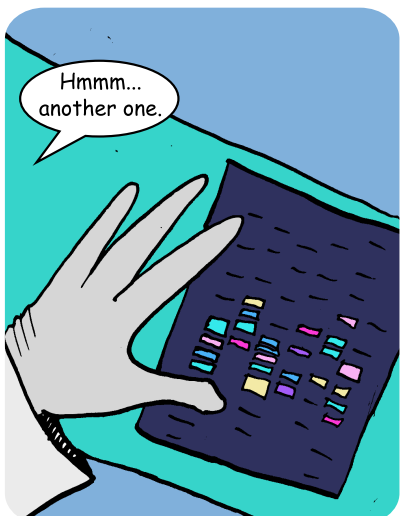
### SpotEye Training

Keep this card. If rolling for environmental investigation research, you may reroll your die. Discard after use.



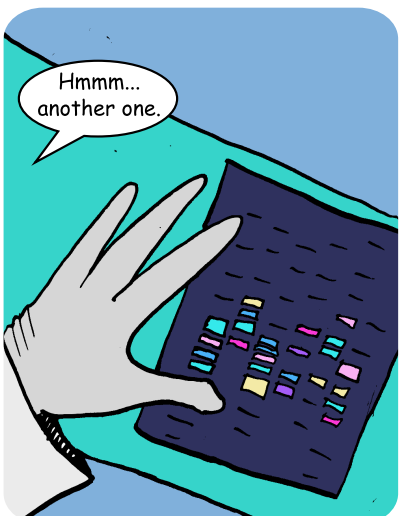
### SpotEye Training

Keep this card. If rolling for environmental investigation research, you may reroll your die. Discard after use.



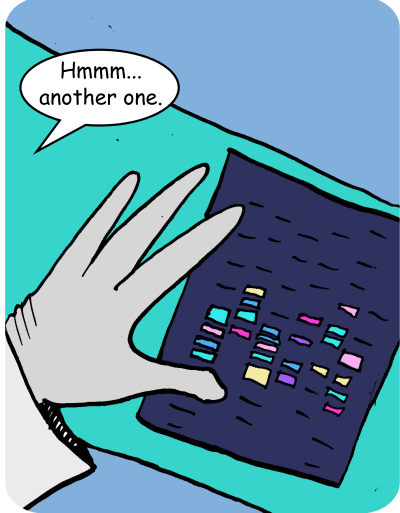
### Lab Cluster

Play immediately. Draw one cluster counter and put it on the board. Discard card after use.



### Lab Cluster

Play immediately. Draw one cluster counter and put it on the board. Discard card after use.



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### "Interesting" Project

Play immediately. You must choose one player. One of that players detectives misses one turn. Discard after use.



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### Lobby Group Intervention

Play immediately. You must choose one player. That player cannot do any environmental investigation research action this turn. Discard after use.



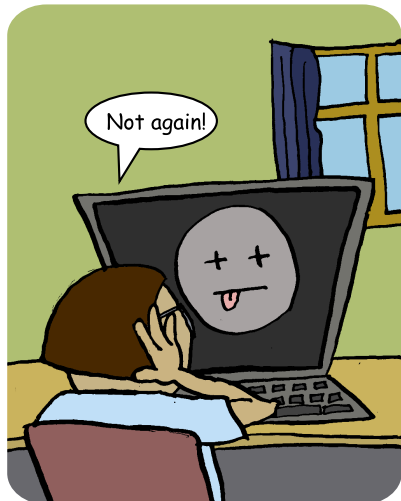
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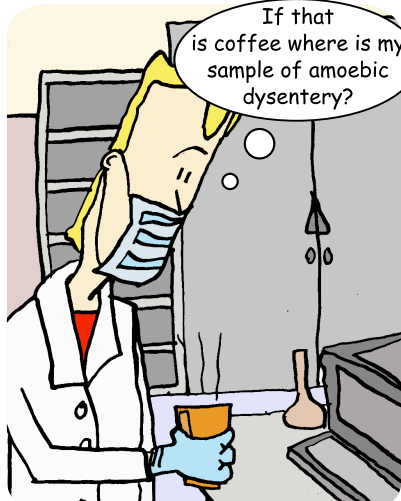
### iTrouble

Play immediately. You must choose one player. That player cannot do any epidemiology research action this turn. Discard after use.



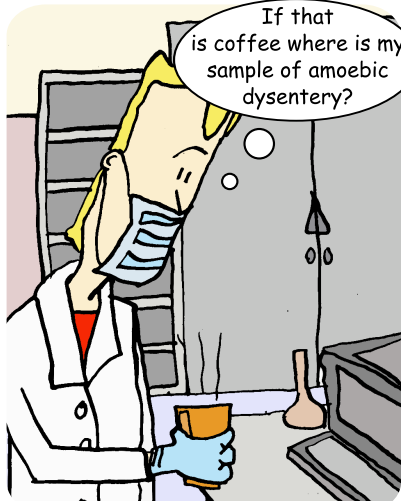
### iTrouble

Play immediately. You must choose one player. That player cannot do any epidemiology research action this turn. Discard after use.



### Specimen Mixup

Play immediately. You must choose one player. That player cannot do any laboratory research action this turn. Discard after use.



### Specimen Mixup

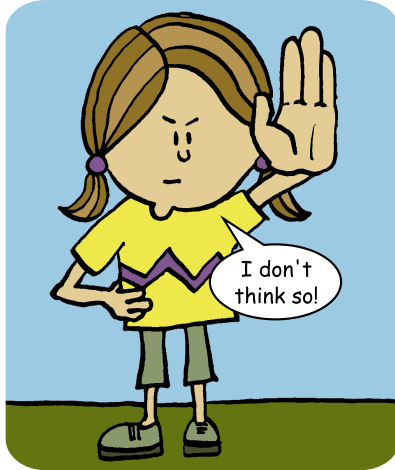
Play immediately. You must choose one player. That player cannot do any laboratory research action this turn. Discard after use.





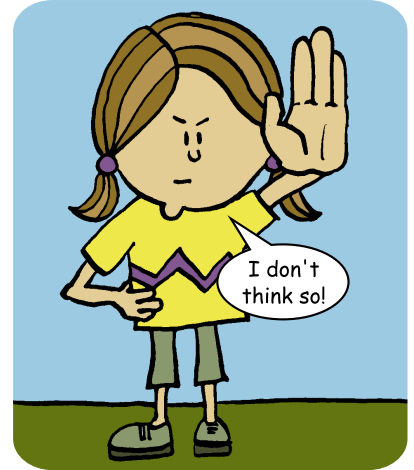
### Outbreak Priority

Keep this card. You can play this card in other players turns. Ignore an "Interesting project", "iTrouble", "Lobby group intervention" or "Specimen mixup" card played against you. Discard after use.



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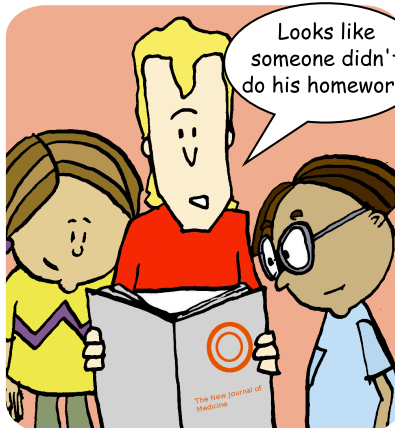
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Keep this card. You can play this card in other players turns. Ignore an "Interesting project", "iTrouble", "Lobby group intervention" or "Specimen mixup" card played against you. Discard after use.



### Literature Review

Keep this card. You can play this card in other players turns. Reflect an "Interesting project", "iTrouble", "Lobby group intervention" or "Specimen mixup" card played against you. The effect of those cards target their originator instead. Discard after use.



### Literature Review

Keep this card. You can play this card in other players turns. Reflect an "Interesting project", "iTrouble", "Lobby group intervention" or "Specimen mixup" card played against you. The effect of those cards target their originator instead. Discard after use.



### EPIET Fellow

Keep this card. Before rolling for research, roll a die:  
1: fellow fouled up: +1 on research difficulty level  
2-3: fellow gained some experience  
4-6: fellow excelled! -1 on research difficulty level.  
Discard after use.



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Discard after use.



### Cab Call

Keep this card. Instead of movement, any or all of your detectives may move directly to their HQ (starting field). Discard after use.



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Keep this card. Instead of movement, any or all of your detectives may move directly to their HQ (starting field). Discard after use.



### Warphole in my Closet

Play immediately. One of your detectives may be moved to any field on the board.



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Play immediately. One of your detectives may be moved to any field on the board.



### Hurry up!

Play immediately. The press conference marker gets advanced by one.



### Hurry up!

Play immediately. The press conference marker gets advanced by one.



### Relax!

Play immediately. The press conference marker moves back by one.



### Relax!

Play immediately. The press conference marker moves back by one.



### Power Outage

Play immediately. For one turn, no player may take laboratory research actions.



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Play immediately. For one turn, no player may take laboratory research actions.



### Patch Day

Play immediately. For one turn, no player may take epidemiology research actions.



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Play immediately. For one turn, no player may take epidemiology research actions.



### Political Intervention

Play immediately. For one turn, no player may take environmental investigation research actions.



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Play immediately. For one turn, no player may take environmental investigation research actions.



### Cloverleaf

Keep this card. Before rolling for research cards you may roll a die.  
1: subtract one from your research roll  
2-3: nothing  
4-6: add one to your research roll  
Discard after use.



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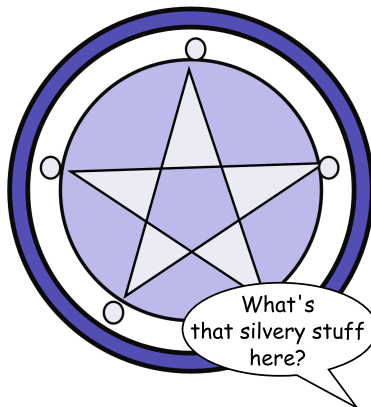
### Rune of Protection

Keep this card. You can ignore the effects of the "Curse of the evil pump handle" once. Discard after use.



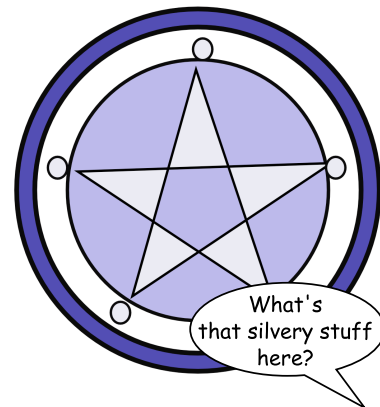
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### Spirit Dust

Keep this card. You may directly move the "Spirit of John Snow" to one of your detectives. Discard after use.



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Keep this card. You may directly move the "Spirit of John Snow" to one of your detectives. Discard after use.



### Precognition

Keep this card. Next time you draw any one card, draw two and pick the one you like. Discard after use.



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Environmental  
Investigation  
Office

Local Health  
Department

### Communication Shortcut

Play immediately. Put this card next to gaming board. From now on, any detective may directly move between the two research units. This cards remains in play.

*"Great teamwork,  
we should have done this earlier!"*

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A 1 EP

Your cohort study on the hospital outbreak showed "potato salad" significantly associated with falling ill.

Multivariable regression reveals "mayonnaise" as another risk factor.

B 1 EP

A 1 EP

The wedding guests' stomachs seemed to have been upset by a self made cheesecake. At least that's what your relative risks tell you.

Stratified analysis points to "eating after 22:00" as an effect modifier.

B 1 EP

A 1 EP

The barbeque attendants should have skipped the "Mousse au Chocolat". Its attributable fraction is 90% with a beautiful RR.

There seems to be a statistical interaction between sex and "tuna salad".

B 1 EP

A 1 EP

After analysing the regional cluster of vomiting and stomach cramps, shopping at the local butchery had the highest odds ratio for falling ill in your case control study.

"Drinking beer" seems to be a protective factor.

B 1 EP

A 1 EP

The school diner had a nasty surprise for all those pesto lovers. Luckily your questionnaire was completed before they all went on holiday.

That is a beautiful epidemiological curve you made!

B 1 EP

A 1 EP

Surprisingly, freshly squeezed orange juice is not always healthy. Especially in foreign tourist hotels.

Now that's what I call a line list!

B 1 EP

A 1 EP

"Something was wrong with the rice pudding!" you conclude after looking at the statistical analysis.

Coding Error! Your study is beyond repair. This card replaces the card in the A slot. Leave the B slot empty. Sorry.

B 1 EP

A 1 EP

"And I always liked turkey sandwich" you think. But after looking at your ORs you consider skipping them for a while.

Coding Error! Your study is beyond repair. This card replaces the card in the A slot. Leave the B slot empty. Sorry.

B 1 EP

A 1 EP

The icecream at the fun fair has had its days. Or so your ORs say.

Shoeleather *EpiPower*: Put three counters on this card. Once during your turn, you may remove one counter to give one of your detectives +1 movement.

B 1 EP

A1 EP

Not washing hands at the pet zoo was highly associated with falling ill.

immunity to THE CURSE.  
give your detective  
may remove one counter to  
Once during your turn, you  
three counters on this card.  
*Immodium EpiPower*: Put

B1 EP

A1 EP

Alfa alfa is usually considered a health food. Your study, however, suggests otherwise.

*Brain EpiPower*: You only need two knowledge cards instead of three to get a reroll.

B1 EP

A1 EP

Hamburgers. Again.

*Focus EpiPower*: Put three counters on this card. You may remove one counter to cancel the effects of an "Interesting project", "Trouble", "Lobby group intervention" or "Specimen mixup" card played against you.

B1 EP

A1 EP

"The manager is unavailable at the moment? You might want to check again. Now."

Food traceback suggests this outbreak belongs to a larger cluster. Draw a cluster counter and put it on this card.

B1 EP

A1 EP

"If you wash the raw chicken here then where do your staff wash their hands?"

Food traceback suggests this outbreak belongs to a larger cluster. Draw a cluster counter and put it on this card.

B1 EP

A1 EP

"Where were your paper towels again?"

Upon closer inspection, the cotton keyring in the fridge magnet box behind the pantry door looked repugnant.

B1 EP

A1 EP

That chopboard seems to be cut from Noah's ark. You take a few samples.

The spare nozzle of the cream dispenser looks a bit out of shape. But full of grease.

B1 EP

A1 EP

This kitchen carpet had a cameo in "Night of the living Dead".

The freezer protocol is very informative.

B1 EP

A1 EP

"The bucket of lard is from the last millenium. You should consider bying a new one."

You spot crucial contradictions in the interviews of the kitchen personell.

B1 EP

A
1 EP

"Your kitchen utensils look a bit rugged. I recommend bying new ones. Without wooden grips this time."

B
1 EP

Testimony withdrawal! The investigation is beyond repair. This card replaces the card in the A slot. Leave the B slot empty. Sorry.

A
1 EP

The complete absence of even basic hygiene is overwhelming.

B
1 EP

Testimony withdrawal! The investigation is beyond repair. This card replaces the card in the A slot. Leave the B slot empty. Sorry.

A
1 EP

This fridge is alive.

B
1 EP

Shoeleather *EpiPower*. Put three counters on this card. Once during your turn, you may remove one counter to give one of your detectives +1 movement.

A
1 EP

"Thanks for your cooperation. We'll send you the results as soon as possible."

B
1 EP

*Immodium EpiPower*. Put three counters on this card. Once during your turn, you may remove one counter to give your detective

A
1 EP

"Please send three stool sample to this address."

B
1 EP

*Precog EpiPower*. Put three counters on this card. When you draw one event or knowledge card, you may remove one counter to

A
1 EP

"Where is that rancid smell coming from?"

B
1 EP

*Focus EpiPower*. Put three counters on this card. You may remove one counter to "cancel the effects of an interesting project",

A
1 EP

Salmonella Infantis.

B
1 EP

Multiple contamination: Salmonella Bovismorbificans is also present.

A
1 EP

E. coli O157:H7.

B
1 EP

Multiple contamination: Salmonella Goldcoast is also present.

A
1 EP

Bacillus cereus.

B
1 EP

Molecular finetyping suggest this bug belongs to a cluster. Draw a cluster counter and put it on this card.

A1EP

Salmonella Panama.

Molecular finetyping suggest this bug relating to cluster. Draw a cluster counter and put it on this card.

B1EP

A1EP

Campylobacter jejuni.

Molecular finetyping suggest this bug relating to cluster. Draw a cluster counter and put it on this card.

B1EP

A1EP

Campylobacter coli.

Molecular finetyping suggest this bug relating to cluster. Draw a cluster counter and put it on this card.

B1EP

A1EP

No bug found. However, histamin levels are sky high.

Specimen contamination! The sample is beyond repair. This card replaces the card in the A slot. Leave the B slot empty. Sorry.

B1EP

A1EP

A high load of fecal indicator bugs.

Specimen contamination! The sample is beyond repair. This card replaces the card in the A slot. Leave the B slot empty. Sorry.

B1EP

A1EP

This sample has "Norovirus" written all over it!

Shoelather **EpiPower**. Put three counters on this card. Once during your turn, you may remove one counter to give one of your detectives

B1EP

A1EP

Salmonella Typhimurium.

Immodium **EpiPower**. Put three counters on this card. Once during your turn, you may remove one counter to give your detective

B1EP

A1EP

Salmonella Enteritidis.

Brain **EpiPower**. You only need two knowledge cards instead of three to get a reroll.

B1EP

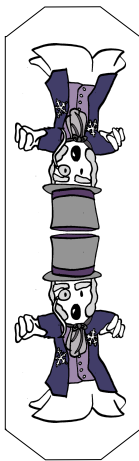
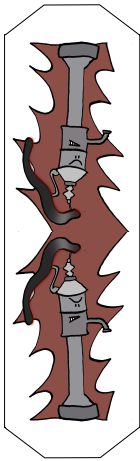
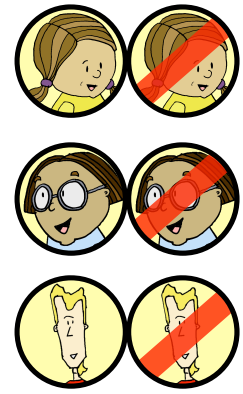
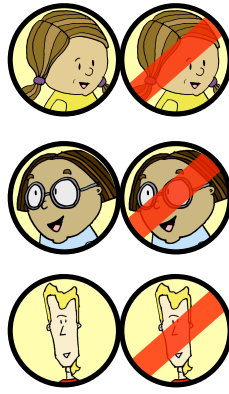
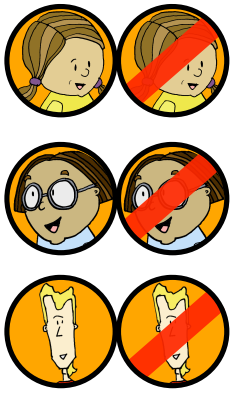
A1EP

Salmonella Enteritidis.

Precog **EpiPower**. Put three counters on this card. When you draw one event or knowledge card, you may remove one counter to draw two cards instead an choose the one you like.

B1EP

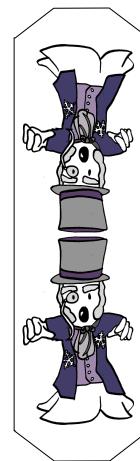
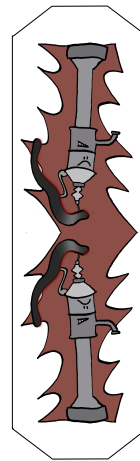




turn marker

The Curse

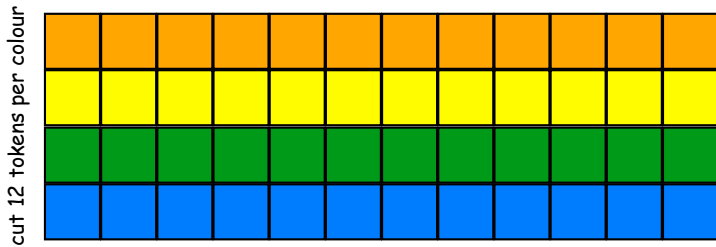
The Spirit



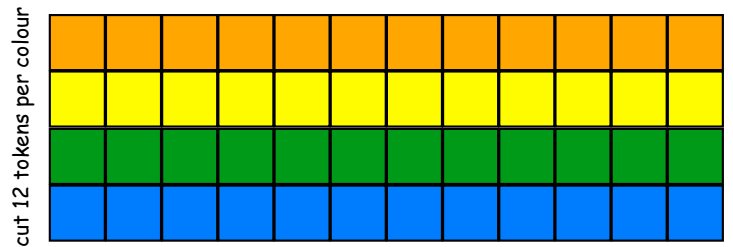
turn marker

The Curse

The Spirit



cluster tokens (optional)



cluster tokens (optional)



**Question:** Why is "Infantis" in "Salmonella Infantis" upper case and not lower case?

**Answer:** "Infantis" is the serovar/serotype, not the species name. The proper name of Salmonella Infantis would be "Salmonella enterica subspecies:enterica serovar:Infantis"

**Question:** What is the proper taxonomic name for Salmonella Enteritidis, starting with genus?

**Answer:** Salmonella enterica subspecies:enterica serovar:Enteritidis

**Question:** How do you calculate relative risks (show 2x2 table, hide answer)?

	Outcome		
	ill	not ill	
Exposure	exposed	a    b	a+b
	not exposed	c    d	c+d
	a+c	b+d	E

**Answer:** The relative risk is the risk of disease for the exposed divided by the risk of disease for the unexposed.

$$\frac{\frac{a}{a+b}}{\frac{c}{c+d}}$$

**Question:** How do you calculate odds ratios (show 2x2 table, hide answer)?

	Case : Control		
	ill	not ill	
Exposure	exposed	a    b	a+b
	not exposed	c    d	c+d
	a+c	b+d	E

**Answer:** The odds ratio is the odds of being a case for exposed divided by the odds of being a case for unexposed.

$$\frac{\frac{a}{b}}{\frac{c}{d}}$$

**Question:** How do you calculate population attributable risk % (show 2x2 table, hide answer)?

	Outcome		
	ill	not ill	
Exposure	exposed	a    b	a+b
	not exposed	c    d	c+d
	a+c	b+d	E

**Answer:** (total risk - risk unexposed)/total risk = "total risk difference per total risk"

$$\frac{\frac{a+b}{E} - \frac{c}{c+d}}{\frac{a+b}{E}}$$

**Question:** How do you calculate attributable risk % (show 2x2 table, hide answer)?

	Outcome		
	ill	not ill	
Exposure	exposed	a    b	a+b
	not exposed	c    d	c+d
	a+c	b+d	E

**Answer:** 1 - 1/relative risk, "risk difference per risk exposed"

$$\frac{\frac{a}{a+b} - \frac{c}{c+d}}{\frac{a}{a+b}}$$

**Question:** How do you calculate risk difference (show 2x2 table, hide answer)?

	Outcome		
	ill	not ill	
Exposure	exposed	a    b	a+b
	not exposed	c    d	c+d
	a+c	b+d	E

**Answer:** Risk of exposed - risk of unexposed

$$\frac{a}{a+b} - \frac{c}{c+d}$$

**Question:** How do you calculate vaccine preventable fraction (show 2x2 table, hide answer)?

	Outcome		
	ill	not ill	
Exposure	vaccinated	a    b	a+b
	not vaccin.	c    d	c+d
	a+c	b+d	E

**Answer:** Risk of unvacc. - risk of vacc. per risk of unvaccinated = 1 - Relative Risk

$$\frac{\frac{c}{c+d} - \frac{a}{a+b}}{\frac{c}{c+d}}$$

**Question:** Which of the following measures is best suited for measuring the strength of association between exposure and outcome:

- Relative Risk
- Risk Difference
- Attributable Risk
- Population Attributable Risk

**Answer:** Relative Risk

**Question:** Which of the following measures is best suited for measuring the added risk of exposure:

- a) Relative Risk
- b) Risk Difference
- c) Attributable Risk
- d) Population Attributable Risk

**Answer:** Risk Difference

**Question:** Which of the following measures is best suited for measuring the proportion of cases caused by exposure:

- a) Relative Risk
- b) Risk Difference
- c) Attributable Risk
- d) Population Attributable Risk

**Answer:** Attributable Risk

**Question:** Which of the following measures is best suited for measuring the public health relevant prevention potential of an exposure:

- a) Relative Risk
- b) Risk Difference
- c) Attributable Risk
- d) Population Attributable Risk

**Answer:** Population Attributable Risk

**Question:** How do you calculate the positive predictive value (show 2x2 table, hide answer)?

		True Value		
		ill	not ill	
Test Result	positive	a	b	a+b
	negative	c	d	c+d
		a+c	b+d	E

**Answer:** PPV= The % among those classified as sick (tested positive) who really are sick.  
 $P(D|T+) = \text{probability of disease given a positive test.}$

$$\frac{a}{a+b}$$

**Question:** How do you calculate the negative predictive value (show 2x2 table, hide answer)?

		True Value		
		ill	not ill	
Test Result	positive	a	b	a+b
	negative	c	d	c+d
		a+c	b+d	E

**Answer:** NPV= The % among those classified as healthy (tested negative) who really are healthy.  
 $P(H|T-) = \text{probability of being healthy given a negative test}$

$$\frac{d}{c+d}$$

**Question:** How do you calculate the sensitivity of a test (show 2x2 table, hide answer)?

		True Value		
		ill	not ill	
Test Result	positive	a	b	a+b
	negative	c	d	c+d
		a+c	b+d	E

**Answer:** The % among those who are truly sick that were classified as sick (tested positive), "which % of the truly sick tested positive".  
 % of positive tests among cases.

$$\frac{a}{a+c}$$

**Question:** How do you calculate the specificity of a test (show 2x2 table, hide answer)?

		True Value		
		ill	not ill	
Test Result	positive	a	b	a+b
	negative	c	d	c+d
		a+c	b+d	E

**Answer:** The % among those who are truly healthy that were classified as healthy (tested negative), "which % of the truly healthy tested negative".  
 % of negative tests among non-cases.

$$\frac{d}{b+d}$$

**Question:** Why can't you calculate relative risks from a traditional case control study?

**Answer:** The total number of exposed and the total number of unexposed needed for the relative risks varies with the number of selected controls, which is arbitrary. This effect cancels itself out for odds ratios.

**Question:** Can you calculate odds ratios for cohort studies?

**Answer:** Yes, you can. Most people would prefer calculating relative risks as a better approximation to the probability of getting ill after exposure, though.

**Question:** What is confounding?

**Answer:** "A confounder is connected to exposure and disease, but not on a causal pathway. It can mask the true effect of a variable or fake an effect."

"Confounding can occur when a variable related to the condition under study is associated with, but not a consequence of, the exposure under investigation."

"I have a leather allergy. Whenever I go to bed with my leather shoes on, I wake up with a headache." The researcher postulates an effect of wearing leather shoes (exposure) on morning headache (outcome). The true reason is his binge the night before: he was too drunk to get of his shoes. Here, alcohol (confounder) fakes an effect "leather shoes > headache", without being a consequence of the exposure (wearing leather shoes).

**Question:** What is effect modification?

**Answer:** "Effect modification leads to different degrees of association between exposure and outcome in different subgroups of the population."

"A third variable is an effect modifier if its strata show different degrees of association between the exposure variable and outcome."

"Effect modification occurs when the magnitude of the association between one variable and another differs according to the level of a third variable."

**Question:** Name your vaccinations.

**Answer:**

Under 6: shame on you! discard card.

6 and more: keep card.

**Question:** When was global smallpox eradication officially certified by WHO?

**Answer:** December 1979

**Question:** What does PFGE stand for?

**Answer:** Pulse Field Gel Electrophoresis. Genomic bacterial DNA gets chopped up into characteristic pieces. The pieces are separated using a cleverly set up gel-electrophoresis chamber with alternating current flows. Allows genetic finetyping.

**Question:** What does MALDI-TOF stand for?

**Answer:** Matrix Assisted Laser Desorption Ionisation Time Of Flight, short for blast-my-probe-with-a-laser-and-see-how-fast-its-fragments travel. A protein gets split up in a characteristic way, resulting in a fingerprint.

**Question:** What does MLVA stand for?

**Answer:** "Milva": Multiple Loci VNTR Analysis, VNTR: Variable Number of Tandem Repeats. Measure the number of DNA-repeats at different sites in a bacterial genome to obtain a genetic fingerprint of it.

**Question:** What does CDC stand for?

**Answer:** Centers for Disease Control and Prevention

**Question:** What does ECDC stand for?

**Answer:** European Centre for Disease Prevention and Control.

Shame on you if you got this wrong and are employed by ECDC!



**Movement:** Move each of your detectives up to 6 fields, unless they are flipped on their "miss turn" side. Draw cards if ending on coloured fields.

**Research Action:** any of your active detectives on a research unit field may take a research action: flip to "miss turn" side and put one token on the research unit. Detectives may do research actions after movement.

**Re-activating detectives:** all of your detectives that *started this turn* on their "miss turn" side are flipped after movement.

**Research Roll:** active detectives in a research unit roll two die. Apply rerolls or card bonuses. Add one for each of your research tokens in that research unit. After modification, your result has to be at least as high as the complexity level for a successful research.  
If successful, draw a research card. The A-slot has to be filled before drawing for the B-slot.  
After research roll, remove all of your tokens, whether you were successful or not and move your researching detective to his HQ.

## Curse of the Black Pump Handle

If any of your detectives shares the field with the Black Pump Handle after rolling for movement of "The Spirit" and before rolling for movement for "The Curse", roll a die and check on this table:  
1-4: "Ouch!" Mysterious stomach cramps force your detective to miss one turn.  
5-6: "Oops. Pardon me." An ancient evil floats by.

**B** Complexity: 10

**A** Complexity: 8

Local Health  
Department

**B** Complexity: 9

**A** Complexity: 7

Environmental  
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Microbiological  
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