Pharmacy Society of Wisconsin

MEDICAL MISINFORMATION

CREATED BY:
PSW AMBULATORY CARE ADVISORY COMMITTEE

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This Medical Misinformation Toolkit is intended to support pharmacy professionals in identifying, evaluating, and addressing medical misinformation with patients and within their communities. It is provided for educational and informational purposes only and is not a substitute for professional training, clinical judgment, individualized patient assessment, or current laws, regulations, standards of care, and clinical guidance. Users are responsible for verifying information with appropriate, current, and authoritative sources before applying it in practice. Use of this toolkit constitutes acknowledgment that the Pharmacy Society of Wisconsin and its contributing authors are not responsible for any loss, injury, or other consequence resulting from its use. PSW is under no obligation to update the information contained in this toolkit.

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WHAT IS MEDICAL MISINFORMATION?[1]

Information that is false, inaccurate or misleading

WHY ARE PATIENTS SUSCEPTIBLE TO BEING INFLUENCED BY MISINFORMATION AND WHY IS IT SO TEMPTING TO SHARE IT?[1]

- Desire to protect people we care about
- Search for information that helps make sense of events
- Want to feel connected to others

HOW TO APPROACH MISINFORMATION WITH PATIENTS[1]

COMMON TYPES OF MEDICAL MISINFORMATION[1]

- Memes that were created as a joke and are being reshared
- Websites that look professional, but information is false or misleading
- Quotations where the beginning or end have been deleted to change the meaning
- Selective use of statistics presenting only a subset of data
- Misleading graphs or diagrams that don't tell the whole story
- Old images that recirculate without inclusion of updates
- Edited videos changing the meaning of content

NAVIGATING MEDICAL MISINFORMATION WHEN USING ARTIFICIAL INTELLIGENCE[2]

Artificial intelligence (AI) platforms rapidly generate medical information, but may produce inaccurate, incomplete, or misleading content.

Common Sources of Misinformation in AI:

- Fabricated facts, citations, or clinical recommendations
- Outdated information or guidelines
- Skewed recommendations due to limited or incorrect data

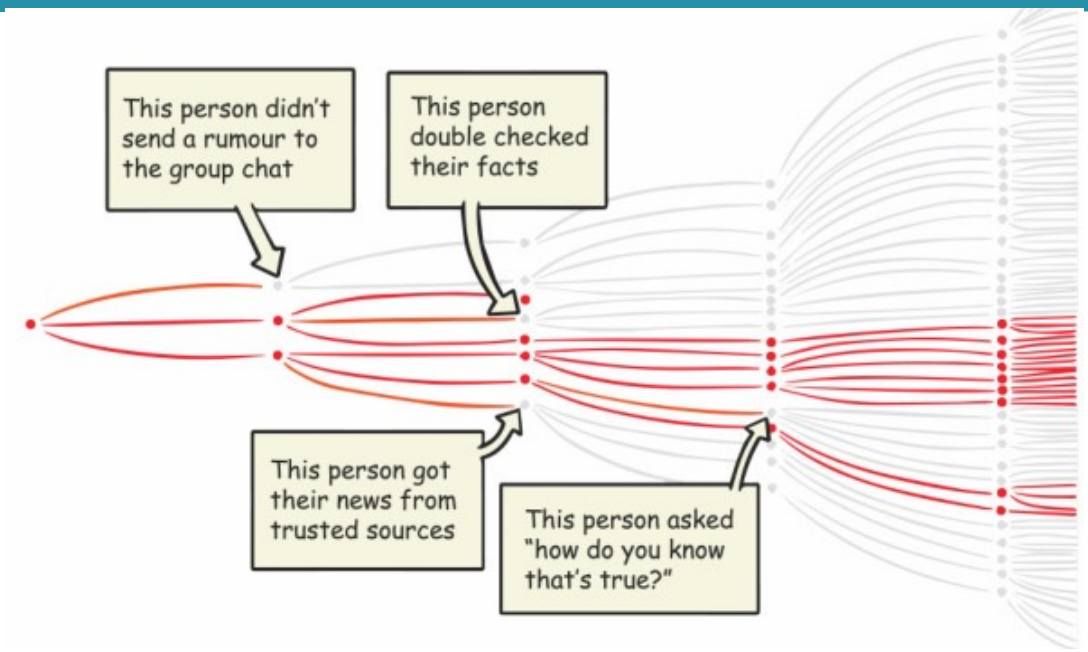
Safe AI Use in Health Care (VITAL AI)[2]:

- **V** – Verify with trusted sources (e.g., ADA, ACC/AHA)
- **I** – Individualize to patient
- **T** – Test against standard of care
- **A** – Assess for bias/gaps
- **L** – Look for citations
- **AI** – Augment, does not replace clinical judgment

VITAL AI *is not a validated tool but is an educational framework used to help healthcare professionals critically evaluate AI-generated information. This framework incorporates principles from WHO guidance on AI ethics and governance and responsible AI practices.*

FIGURE 1. WHO DESCRIBES HOW MISINFORMATION IS SPREAD[3]

Original figure appeared in an article in thespinoff.co.nz and was adapted by the World Health Organization (WHO)[1] through Creative Commons license (CC-BY-SA 4.0).



Conceptual illustration of how individual behaviors influence information dissemination within a network. Red pathways represent the potential spread of rumors or misinformation, whereas gray pathways represent the continued spread of verified, accurate information. The figure emphasizes that small actions taken by many individuals can collectively have a substantial impact on the quality of information shared within a community.

STRATEGIES TO PREVENT THE SPREAD OF MISINFORMATION[4]

1. Develop a framework for medical information/evidence evaluation
   a. Create a culture of information verification
   b. Use established frameworks and tools to assess credibility of information (Table 1)
      i. **A_2C_2QUIRE** - **A**uthorship and publisher, **A**ccessibility, **C**urrency of information, **C**ost and value of materials, **Q**uality of content, **U**sability and resource design, **I**ntent of the resource, **R**eview process, and **E**ndorsements - A_2C_2QUIRE framework[5]
      ii. **CRAAP** - **C**urrency, **R**elevancy, **A**uthority, **A**ccuracy, **P**urpose - CRAAP Test[6]
      iii. **VITAL AI** - framework to evaluate AI-generated health information[2]
2. Optimize and incorporate relevant training and education
   a. Health care professional continuing education should address misinformation and patient education strategies
   b. Health information checklists can be used to educate patients on assessing validity of health information
      i. Office of U.S. Surgeon General Toolkit for Addressing Health Misinformation[7]
3. Empower and incentivize patients to critique information
   a. Social media platforms can limit misinformation through content removal, user reporting, and warning labels with credible sources
   b. Incentivize and guide influencers on how to identify and post credible information
4. Devise a Communication Plan
   a. Establish trust-based communication through listening, empathy, and personalization to improve patient receptivity
   b. Balanced discussion of benefits, risks, and uncertainty builds credibility and incorporates motivational interviewing

HOW TO ADDRESS MISINFORMATION

Table 1. Established Frameworks and Tools to Assess Credibility of Information

Framework	Purpose	Best Used For:
A_2C_2QUIRE[5]	Critical evaluation of health care information sources	Clinical studies, guidelines, tertiary resources, drug information databases
CRAAP[6]	Quick evaluation of information credibility	Websites, social media posts, news articles, patient education materials
VITAL AI[2]	Evaluation of AI-generated health information	ChatGPT, Copilot, Gemini, AI-generated summaries

HOW TO ADDRESS MISINFORMATION[8]

1. Identify the source of the information
   a. Who is providing the information? Is it reputable? Where did they get the information from?
   b. Vet every source of information before letting it influence our professional judgement in communicating to patients
2. Assess our biases
   a. Everyone has biases from their experiences, education and other information sources. Each perspective is different and may impact patient care decisions.
   b. Seek secondary sources if necessary
3. Check the publication date
   a. Health information and clinical guidance is constantly changing and being updated
   b. Advocate for using health resources that frequently update their information
4. Do research
   a. Do not rely on summaries of news articles
   b. Make decisions by reviewing primary and secondary sources
5. Address health misinformation in the community
   a. Proactively engage with patients and the public on health misinformation
   b. Use technology and media platforms to share accurate health information with the public
   c. Partner with community groups and other local organizations to prevent and address health misinformation

A_2C_2QUIRE Framework[5]:

- **A** – Authorship and Publisher
- **A** – Accessibility
- **C** – Currency of information
- **C** – Cost and Value of Materials
- **U** – Quality of Content
- **I** – Intent of the Resource
- **R** – Review process and endorsement
- **E** – Endorsement policies are transparent

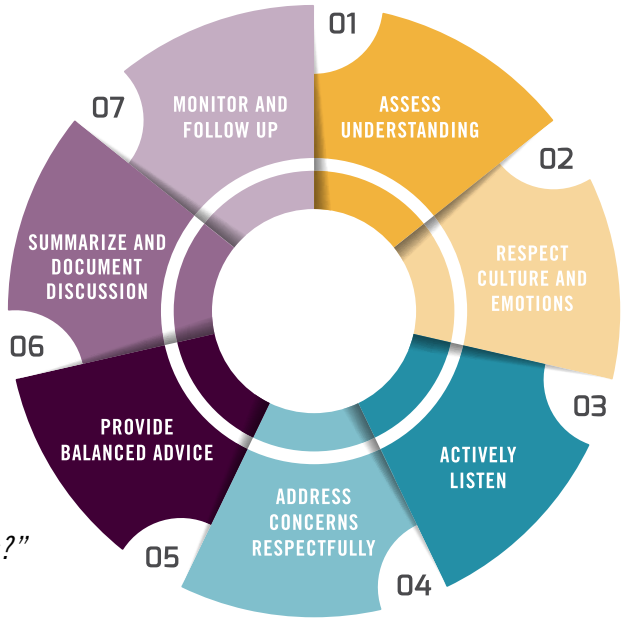
CRAAP Framework[6]:

- **C** – Currency: Timeliness of information
- **R** – Relevance: How information fits the needs
- **A** – Authority: Source of information
- **A** – Accuracy: Reliability and correctness of information
- **P** – Purpose: Reason the information exists

EXAMPLE IN PRACTICE

Responding to the Claim "Vaccines Cause Autismn[11]

This approach can be applied to any health misinformation claim, making it a practical framework for pharmacy professionals when discussing medications, vaccines, supplements, weight-loss products, social media health trends, or other medical misinformation.[9]



1. Assess Understanding

Begin by understanding the patient's concern without judgment.

Ask:

- *"Can you tell me more about what you've heard?"*
- *"What concerns you most about vaccines?"*
- *"What information has led you to this concern?"*

Explore the source

- Ask where the information came from.
- Determine whether the source appears reputable, current, and evidence-based.
- Assess the patient's current knowledge and potential health literacy.

2. Respect Culture and Emotions

Build trust before providing education.

- Acknowledge the patient's desire to make the best decision, and recognize that emotions, personal experiences, cultural beliefs, and family influences often shape health decisions.
- Avoid dismissive, argumentative, or judgmental language.
- Use respectful, inclusive, and empathetic communication.

Example:

"It's understandable that you want to make the safest choice. I'm so pleased you felt comfortable sharing this concern with me. Many parents and caregivers have similar questions."

3. Actively Listen

Focus on understanding before responding.

- Allow the patient to finish speaking without interruption.
- Use open-ended questions to better understand their concerns and reflect back what you heard to ensure understanding.
- Ask permission before sharing additional information when appropriate.

4. Address Concerns Respectfully

Respond to concerns using empathy and evidence.

- Correct misinformation without criticizing the patient or the source they encountered.
- Distinguish between opinions, anecdotes, and scientific evidence.
- Acknowledge areas where science continues to evolve while emphasizing where strong evidence exists.
- Encourage shared decision-making.

5. Provide Balanced Advice

Provide clear, balanced, evidence-based information.

Key Facts

- The 1998 study that suggested a link between vaccines and autism was fraudulent and has been retracted.
- Multiple large, high-quality studies involving more than one million children have found no association between vaccines and autism.

Example:
"The original study that suggested a link between vaccines and autism was found to be false and was removed from the medical literature. Since then, numerous large, well-designed, peer-reviewed studies involving millions of people have consistently found no evidence that vaccines cause autism. Today, vaccines remain one of the safest and most effective ways to protect children and adults from serious, preventable diseases."

Help patients evaluate future health claims and explore further. Encourage patients to:

- Verify the source (Is this a trusted, credible organization?)
- Check the publication date (Is the information current?)
- Look for consistent findings across multiple high-quality sources.
- Refer to trusted organizations such as the Centers for Disease Control (CDC), American Academy of Pediatrics (AAP), World Health Organization (WHO), FDA, or their healthcare team.

Use toolkit frameworks such as A_2C_2QUIRE, CRAAP, or VITAL AI to demonstrate how to critically evaluate health information.

6. Summarize and Offer Ongoing Support

Reinforce the key message and invite future conversations.

Example:
"The evidence we reviewed today consistently shows that vaccines do not cause autism. I encourage you to continue asking questions and learning more. As you look at information online or hear things from others, try using some of the evaluation tools we discussed to determine whether the information is trustworthy and evidence-based. Being an informed healthcare consumer is one of the best ways to advocate for your health. If you ever come across another health claim that raises questions, please feel free to bring it to me. We can look at the evidence together and discuss what it means for you or your family."

Offer support

- Introduce and provide reputable educational resources and reinforce that questions are welcome throughout future care.
- Encourage follow up with the pharmacy or another trusted healthcare professional.

7. Monitor and Follow Up

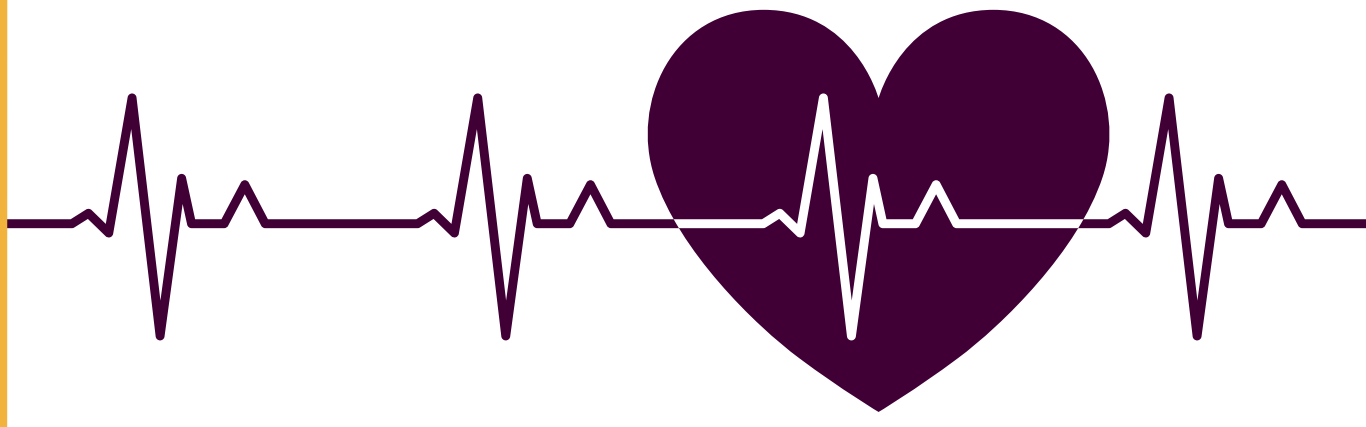
Recognize that changing beliefs often takes time.

- Revisit the conversation during future encounters when appropriate.
- Address any new questions or concerns that have arisen.
- Document clinically relevant counseling when appropriate.
- Continue serving as a trusted source of evidence-based health information and support

Summary of Common Myths, Evidence, and Counseling Pearls

STATINS

Common Myths	Evidence Shows....	Clinical Counseling Pearls	Statins References
Statins cause muscle problems	True statin-related muscle symptoms are rare (<0.1%), and most reported symptoms are due to the nocebo effect (~90%). Serious myopathy and rhabdomyolysis are extremely uncommon.	• Ask patients to describe location and severity of muscle pain • Advocate for possible dose reduction, switching statins or transition to non-statin alternative	2,3,5-7
Statins cause diabetes	Statins only modestly increase diabetes risk in patients who already have metabolic risk factors. They do not cause diabetes in low-risk individuals. Cardiovascular benefits far outweigh this risk.	• Reassure that statins do not cause diabetes in most people • For patients at a higher risk, emphasize that preventing heart attack and stroke is very important and changes in blood sugars can be monitored if concerning	2,3
Statins cause liver damage	Mild, transient liver enzyme elevations may occur, but serious liver injury is extremely rare (0.001%). Stable chronic liver disease and metabolic dysfunction-associated steatotic liver disease (MASLD) is not a contraindication to statin therapy.	• Clarify with patients that routine liver monitoring is not needed unless symptoms occur, remind them of the possible symptoms they may need to watch for	1-3
Statins cause memory loss or dementia	No robust evidence links statins to cognitive decline. The brain produces its own cholesterol independent of blood levels.	• Reassure patients that statins do not affect memory • Emphasize that the use of statins helps to prevent the risk of stroke and helps maintain long-term brain health	8,9
Statins are dangerous in older adults	Statins remain safe and effective in older adults when clinically indicated.	• Age alone should not preclude the use of statin therapy when clinically indicated • Remind patients of the need for heart/stroke protection typically increases with age	2,3
Statin-associated side effects are permanent	Most patients can successfully restart statins with a different agent or dose if they previously experience statin-associated side effects.	• Encourage patients to retry therapy (motivational interviewing) • Suggest patients restart with an alternative statin, lower dose, or combination with non-statin therapy	3,6,10
Statins don't prevent cardiovascular disease	Statins reduce cholesterol plaque progression, stabilize plaques and lower inflammation preventing heart attacks and strokes.	• Emphasize statins are first-line therapy for prevention of cardiovascular events (stroke, heart attack)	11

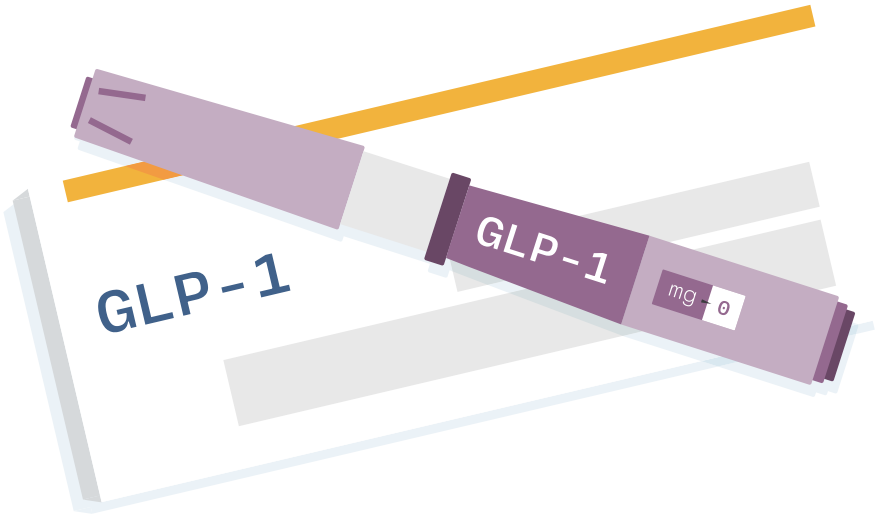


METFORMIN

Common Myths	Evidence Shows….	Clinical Counseling Pearls	Metformin References
Metformin damages kidneys	Metformin does not cause kidney damage. Dose adjustments are required when kidney function declines to an eGFR of 30 mL/min/1.73 m2 because the drug is eliminated renally. Lactic acidosis due to metformin is extremely rare (<1 per 10,000 pt-years)	• Reassure patients that metformin is kidney-safe • Encourage patients to participate in routine renal monitoring to avoid risk of lactic acidosis with reduced kidney function.	1,3-8
Metformin is toxic to the liver	Metformin is not metabolized by the liver and does not cause liver injury. It is avoided only in severe liver disease due to concerns for impaired lactate clearance.	• Clarify that metformin does not injure the liver • Counsel patients to avoid excessive alcohol consumption	9-11
Metformin causes hypoglycemia	Metformin does not stimulate insulin secretion, so hypoglycemia risk is minimal unless combined with insulin or sulfonylureas.	• Explain that metformin does not cause low blood sugar on its own, but other medications used to treat diabetes can • Review the patient's regimen for other medications that may cause hypoglycemia	2
Metformin causes intolerable gastrointestinal (GI) side effects	GI symptoms are common but temporary and manageable with slow titration, food, or extended-release (ER) formulation.	• Counsel patients that nausea/diarrhea and bloating are temporary and often improve • Recommend taking metformin with food, starting low, titrating slowly, or switching to ER formulation and share if symptoms persist	12-13
Metformin prevents cancer and slows aging	Observational studies suggest possible benefits, but no randomized control trials confirm anti-cancer or anti-aging effects.	• Reinforce that metformin was prescribed for the evidence-based management of diabetes, and that at this time it's not used for anti-aging or cancer prevention	14-18

GLUCAGON LIKE PEPTIDE-1 RECEPTOR AGONISTS (GLP-1 RA)

Common Myths	Evidence Shows....	Clinical Counseling Pearls	GLP-1 RA References
Compounded GLP-1 RA versions from online pharmacies are just as safe and effective	Compounded GLP-1 RAs are not Food & Drug Administration (FDA)-approved and have been associated with contamination, dosing errors and impurities.	• Discourage the use of compounded versions of GLP-1 RA medications • Remind and reinforce that FDA-approved GLP-1 RAs undergo strict quality testing and are safer and assured to be effective	1-4
GLP-1 RA medications cause cancer, depression and hair loss	**Cancer:** Human studies have not shown increased risks of thyroid, pancreatic or breast cancer. **Depression:** Studies found no increased risk of depression or suicidal thoughts **Hair loss:** Hair thinning (3-5%) is due to weight loss-related temporary hair shedding (telogen effluvium), not the drug.	• Reassure patients that cancer and mental health risks are not increased • Explain that hair shedding is temporary, and related to rapid weight change, but encourage ongoing dialogue about their symptoms and concerns	5-10
Stopping GLP-1 RAs causes weight gain	Average regain is 7-12% within one year of stopping which reflects loss of medication effect, not treatment failure.	• Clarify that some weight regain is expected when the medication is stopped • Encourage patient to continue following healthy lifestyle interventions including a balanced diet, physical activity and behavioral strategies to support weight maintenance	11-14
GLP-1 RA medications are only for weight loss	GLP-1 RAs were developed for type 2 diabetes and also reduce cardiovascular events, improve kidney/liver disease and help sleep apnea.	• Emphasize that GLP-1 RA are medical treatments, not cosmetic weight-loss drugs • Clarify with patients the differences between diabetes and weight-management indications	6,14-16
GLP-1 RAs cause severe hypoglycemia	GLP-1 RAs have low intrinsic hypoglycemia risk unless combined with insulin or sulfonylureas	• Reinforce that GLP-1 RAs do not cause low blood sugar alone, but other medications used to treat diabetes can • Review regimen for other agents that may increase hypoglycemia risk	6,16



HERBALS & SUPPLEMENTS

Common Myths	Evidence Shows....	Clinical Counseling Pearls	Herbals and Supplement References
Natural means safe	Natural products can cause serious harm, including liver/kidney injury and drug interactions	• Explain that natural does NOT necessarily mean safe and in some cases can mean unsafe if not carefully evaluated • Encourage patients to share with their healthcare team all natural supplements, herbals, and over the counter therapies	2
FDA approves supplements before sale	Supplements do not require FDA approval before marketing. FDA only intervenes after harm occurs.	• Clarify with patients that supplements are regulated differently from drugs and medications • Reinforce that safety and efficacy are not verified before sale, and finding a product that has been evaluated for safety and efficacy is very important	3
Label always matches what's in the bottle	Since supplements are not regulated by the FDA, they can contain incorrect ingredients, contaminants or undisclosed prescription drugs.	• Encourage choosing USP, NSF or ConsumerLab verified products • Seek out products that explicitly define all the ingredients included in the product • Remind patients that more expensive options doesn't necessarily mean safe or accurate	4,5
If it's sold in stores, it must work	Manufacturers are not required to prove efficacy before selling supplements	• Provide evidence-based alternatives when appropriate • Remind patients that stores seek to increase sales, not necessarily safety, and that the store has no requirement to assure the drug works	3
I don't need to tell my doctor about supplements	Supplements can interact with medications, worsen conditions and alter treatment	• Encourage patients to share with their healthcare team all natural supplements, herbals, and over the counter therapies • Review for interactions and adverse effects • Encourage patients to always report side effects experienced	6,7

VACCINES

Common Myths	Evidence Shows....	Clinical Counseling Pearls	Vaccine References
Vaccines cause autism	This claim originated from a 1998 study that was fraudulent and later retracted. Large studies involving millions of children show no association between vaccines and autism.	• Explain to patients that the original study that created this concern has been proven to be fraudulent and false • Acknowledge the parent's concern and explain that many studies and real-life experience have shown no link between vaccines and autism	2-4
Vaccines contain dangerous toxins	Aluminum/formaldehyde are present in tiny and safe amounts far below daily exposure found in food, water and air. Thimerosal has been removed from nearly all childhood vaccines. Larger studies show no association between these ingredients and harm.	• Confirm with patients that vaccine ingredients like aluminum or formaldehyde are present in very small, but safe amounts • Enlighten patients that aluminum exposure from their diet is typically higher than the amount found in vaccines • Teach patients that the human body naturally produces more formaldehyde than is contained in vaccines	3-6
Too many vaccines overwhelm the immune system	Large studies show no association between immune overload or increased infection risk after administration of multiple vaccines during the same visit. Children encounter thousands of antigens daily through routine environmental exposure, and vaccines add very few.	• Emphasize that vaccines represent a very small portion of the immune system exposures people encounter daily through routine contact with their environment. • The immunization schedule approved by the Centers for Disease Control is safe and well-studied	4,7
Natural immunity is better	Natural infection can produce a strong immune response, carrying higher risk of severe illness, complications, and death. Vaccines provide safe, controlled immunity without disease risk.	• Emphasize that vaccination allows the immune system to learn and 'remember' without exposing the patient to diseases that could have lasting and serious symptoms	8
Vaccines weaken the immune system	Vaccines strengthen immunity by training it to recognize pathogens. Research shows no difference in overall immune function between vaccinated and unvaccinated children.	• Explain that vaccines "train" the immune system rather than weaken it, preparing it to fight if and when exposed to the virus, bacteria or infection • Share that natural infections weaken immunity, while the body fights the infection, more than vaccines	1,8
Diseases were already disappearing before vaccines	Measles cases dropped 95% only after vaccine introduction. This decline is too rapid to be explained by hygiene alone. Diseases have been shown to return when vaccination rates drop.	• Remind patients that vaccines help prevent resurgence, like maintaining your car, weeding your garden, or exercising daily, vaccines keep illnesses from returning or worsening • Explore with patients how outbreaks can occur when vaccination rates decline	8
Vaccines can be safely delayed and spaced out	Immunization schedule protects children when they are most vulnerable. Delays in vaccination leave children unprotected and increases risk of missing the vaccine entirely.	• Reinforce with patients and caregivers that the schedule is evidence-based, and designed to protect children as early as possible offering them immunity as they are introduced to more activities (school) and groups of people	8

Please reference Appendix for more information.

PATIENT CARE RESOURCES:

- Office of U.S. Surgeon General Toolkit for Addressing Health Misinformation[7]
- Office of U.S. Surgeon General Health Misinformation Checklist[10]

REPUTABLE RESOURCES:

- U.S. Government & Public Health
  - » Agency for Healthcare Research and Quality (AHRQ) – Patient safety
  - » Centers for Disease Control and Prevention (CDC) – Public health, prevention, vaccines, infectious diseases
  - » FDA – Medication safety, recalls, approvals, drug & device information
  - » Medline Plus (NIH/NLM) – Plain-language, evidence-based health information
  - » National Institutes of Health (NIH) – Disease-specific institutes
- Academic & Nonprofit Medical Organizations
  - » Cleveland Clinic – Symptom guides, disease education
  - » John Hopkins Medicine – Clinical and preventive health content
  - » Kaiser Permanente Health Encyclopedia – Clear, practical health topics
  - » Mayo Clinic – Patient-friendly explanations of conditions, tests and treatments
- Artificial Intelligence Platforms
  - » Consensus – Research questions providing strength of evidence across studies
  - » DoxGPT – Quick clinical thinking support or draft reasoning
  - » Medisearch – Structured medical search with easy-to-read summaries
  - » Open Evidence - Evidence-based clinical decision support
- Disease Specific & Advocacy Organizations
  - » American Diabetes Association (ADA) – Diabetes education and care
  - » American Heart Association (AHA) – Cardiovascular disease
- Evidence Based & Research Resources
  - » Cochrane Library – Systematic reviews of healthcare interventions
  - » PubMed – Biomedical literature (professional level)
  - » UpToDate (subscription) – Clinical decision support (professional tool)
- Herbal & Supplement Resources
  - » MedlinePlus - MedlinePlus - Health Information from the National Library of Medicine
  - » National Center for Complementary and Integrative Health - Using Dietary Supplements Wisely | NCCIH
  - » National Institutes of Health Office of Dietary Supplements - Office of Dietary Supplements (ODS)
  - » Natural Medicines database (available through many healthcare systems)
  - » U.S. Food & Drug Administration - FDA 101: Dietary Supplements | FDA
- Medication Focused Resources
  - » ASHP Patient Medication Information – Pharmacist reviewed drug details
  - » DailyMed (NIH/FDA) – Official FDA drug labels
  - » Institute for Safe Medication Practices (ISMP) – Medication safety alerts
- Vaccine Resources
  - » American Pharmacist Association (APhA) - Building Vaccine Confidence
  - » American Academy of Pediatrics - Strategies for Improving Vaccine Communication and Uptake
  - » Centers for Disease Control and Prevention (CDC) - Talking with Parents about Vaccines | Childhood Vaccines | CDC
  - » Immunize.org - Vaccine Hesitancy: Resources & Information
  - » World Health Organization (WHO)- Vaccines Explained | World Health Organization

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