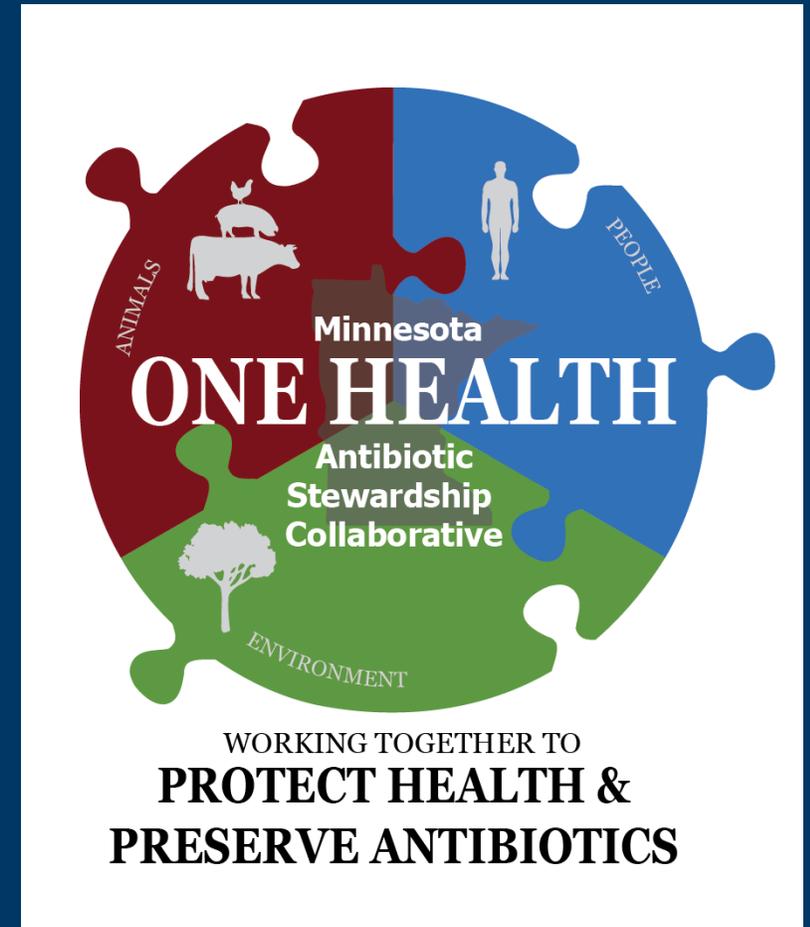


One Health in Action: Minnesota's Collaborative Approach to Antibiotic Stewardship



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Minnesota Department of Health

MN Antibiotic Stewardship Conference, May 1, 2024

Objectives

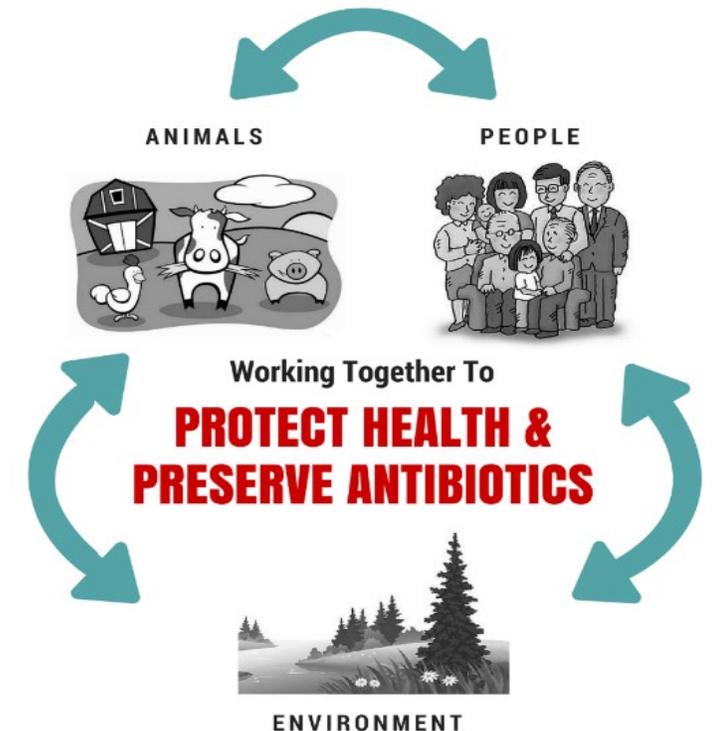
- Define One Health and describe why antibiotic resistance and stewardship are One Health issues.
- Explain the benefits of having multidisciplinary teams involved in antibiotic stewardship across multiple settings.
- Describe how antibiotic stewardship principles and implementation strategies are approached through a One Health perspective in Minnesota.



Antibiotic Resistance as a One Health Issue

Antibiotic Resistance and Stewardship as One Health Issues

- **All users of antibiotics contribute to resistance**
 - Improvement must occur in all sectors
- **Development of resistance is very complex**
 - Direct linkage of cause and effect is difficult or impossible
- **Exposure to resistant bacteria or genes is not limited only to the sector from which they emerged**
 - Resistant bacteria or resistance genes can persist in varied settings
- **Methods of resistance prevention are similar, regardless of setting**
 - Effective tools and approaches can be shared



Who Uses Antibiotics?

- **Human health care**
 - Acute care, critical access hospitals
 - Long-term care facilities
 - Outpatient facilities
 - Ambulatory surgical facilities
 - Dental clinics
- **Veterinary medicine**
 - Companion animal medicine
 - Animal agriculture
 - Aquaculture
 - Honeybee production
- **Plant agriculture**
 - Fruit production
- **Industry**
 - Ethanol
 - Probiotics



Companion Animals

- **Clinically relevant resistance**
- **Bacterial culture and sensitivity often not conducted**
 - Antibiotics not always well-targeted
- **Pets often receive medically important antimicrobials**
 - (e.g., cephalosporins, fluoroquinolones)
- **Potential spread of antimicrobial resistance**
 - Direct and close contact with humans
 - Pet-to-pet transmission



Couples in households with dogs have more similar microbiomes than those living alone because of additional shared microbial sources.



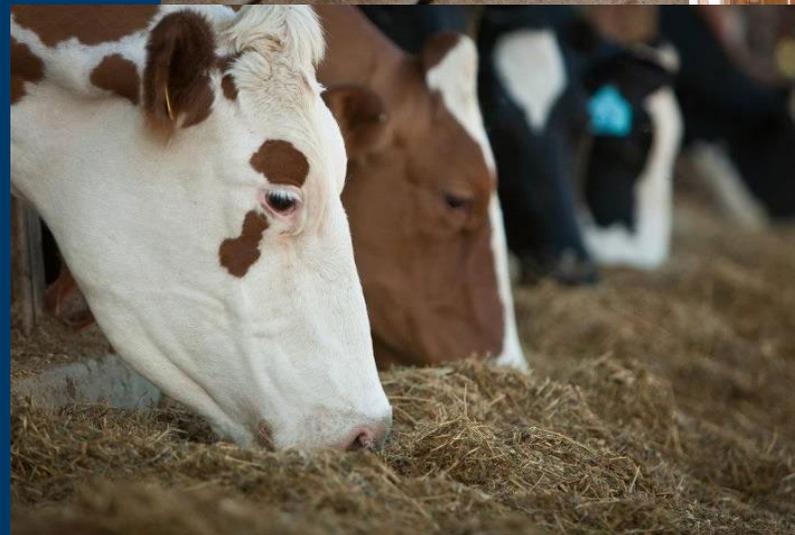
CDC/Dawn Arlotta

Having a dog in the household adds bacterial diversity to adult skin.

Song et al. Cohabiting family members share microbiota with one another and dogs. *eLife* 2013
Image from J. Granick

Animal Agriculture

- **Clinically relevant resistance in veterinary medicine**
 - Antibiotics are important to maintaining animal health and welfare
- **Direct contact transmission of resistant organisms from animals to people**
- **Foodborne infections of humans (e.g., *Campylobacter*, *Salmonella*)**
 - For those at risk of systemic or complicated infections, concerns with resistance are considerable



- Antibiotic residues found in groundwater, lakes, and streams
 - Macrolides: erythromycin, clarithromycin, virginiamycin, tylosin
 - Fluoroquinolones: ciprofloxacin, moxifloxacin
 - Sulfa drugs: sulfamethoxazole, sulfachloropyridazine
 - Others: carbadox, trimethoprim
- Complex mixtures of antibiotics and metabolites
- Urban, agricultural pathways to contamination
- Consideration of disposal is essential
- Outstanding questions
 - How do antibiotics in environment influence overall resistance?
 - How does antibiotic exposure impact ecology and human health?
 - How can we mitigate impact on environment?





Antibiotic Stewardship and One Health

Common Wants and Fears Around Stewardship and Resistance

WANTS	FEARS
Collaboration, common goals, recognize alignment & differences	Ineffective antibiotics, untreatable infections, death, adverse effects
Decisions made on unbiased data, not politics or public perception	Reactionary decisions without sound science, incorrect assumptions
Community understanding and informed participation	Overregulation replacing careful medical assessment
Minimize environmental contamination for safe food and water supply	Negative impact on environment and ecosystem

Challenges to Stewardship in all Fields

- Competing priorities
 - How to consider the good of the whole rather than individual patients, animals?
- Definition of “optimal”, “judicious”, “appropriate”
 - How do we define this in an evidence-based way?
 - What are the “low-hanging fruit” for stewardship in each field?
- Lack of data
 - How can we set goals and identify progress without data?
 - How can we share data comfortably?
- Association does not equal causation
 - How can we design meaningful research?
- Communication
 - Across fields
 - With public and policy makers



What Does a One Health Approach to AMR & Stewardship Actually Look Like?

- Centered around building trust and relationships
- All sectors come to the table with a shared understanding and collaborative communication approach
- A learner mindset is key to success
- It takes time!

Open Forum Infectious Diseases

PERSPECTIVES INVITED



Minnesota One Health Antibiotic Stewardship Collaborative: A Reproducible Approach to Facilitate Antimicrobial Stewardship Progress

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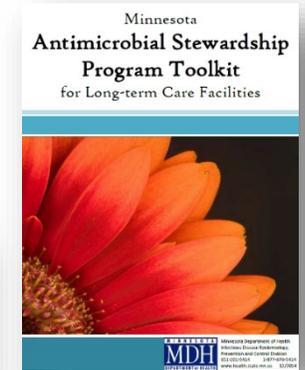
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Minnesota One Health Antibiotic Stewardship Collaborative (MOHASC)

History of Stewardship in Minnesota

- Health care
 - Minnesota Antibiotic Resistance Collaborative (early 2000s)
 - Antibiotic stewardship conferences held (2012-14)
 - Minnesota guidance and toolkits
- Animal health
 - Quality assurance programs
 - Producer and veterinary education programs
 - Residue prevention and legal obligations
 - Veterinary accreditation modules
 - Antibiotic use guidelines developed by veterinary groups
 - Participation in AVMA stewardship committee



Challenges to Stewardship in MN

- Connecting facilities with tools, implementation support
- Poor understanding across human, animal, environmental health



Collaborative One Health approach

What is MOHASC?

MOHASC Vision

Minnesota leaders in human, animal, and environment health will work together to raise awareness and change behaviors to preserve antibiotics and treat infections effectively.

Communication approach



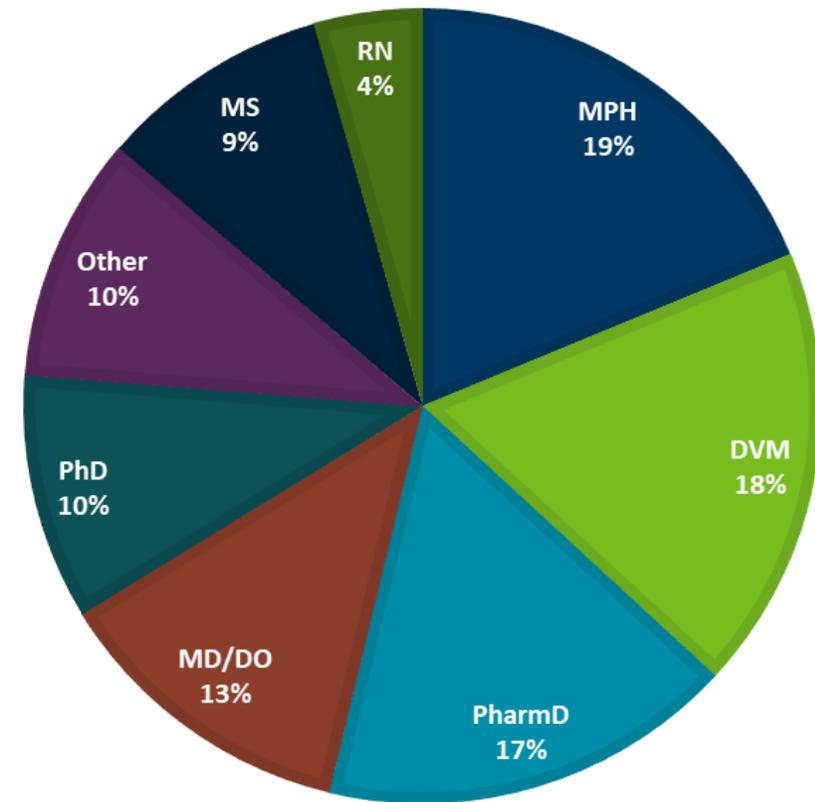
WORKING TOGETHER TO
**PROTECT HEALTH &
PRESERVE ANTIBIOTICS**

- Human, animal, and environmental health are inseparable.
- All antibiotic use can lead to resistance.
- There is some contribution to resistance from every sector using antibiotics.
- Lack of “proof” of harm is not an argument for irresponsible use.
- Greater abuse in other disciplines is not an argument for injudicious use in yours.
- There are unreasonable critics.
- Behavior change is key.

MOHASC Collaborative Participants

- 136 members representing 64 organizations
- Government partners in human health, agriculture, environment, animal health
- Health care professionals
- Veterinary professionals
- University researchers
- Industry and professional organizations
- Pharmaceutical companies
- Producers

MOHASC Member Fields of Study, n=121



How MOHASC Works

Operational Logistics

- Annual in-person meeting
- Four work groups align with strategic goals
- Website
- One Health Exchange events
- Newsletter
- Outreach resources and events

Impact

- Collective vision magnifies state investment
- Common mission energizes daily stewardship practice
- Networking drives practice change
- Evidence-based approaches shared across sectors
- Policy makers and the public receive reliable information

2023–2027 MOHASC Strategic Approach

- **Goals**

- Promote understanding of One Health antibiotic stewardship across disciplines
- Improve human antibiotic stewardship efforts
- Improve animal antibiotic stewardship efforts
- Explore the role of the natural environment in antimicrobial resistance

- **2024 Priorities**

- Ensure stewardship resources and MOHASC opportunities are available to everyone
- Strategic communication with MOHASC members, policy makers, and the public
- Incorporate equity considerations into MOHASC operations

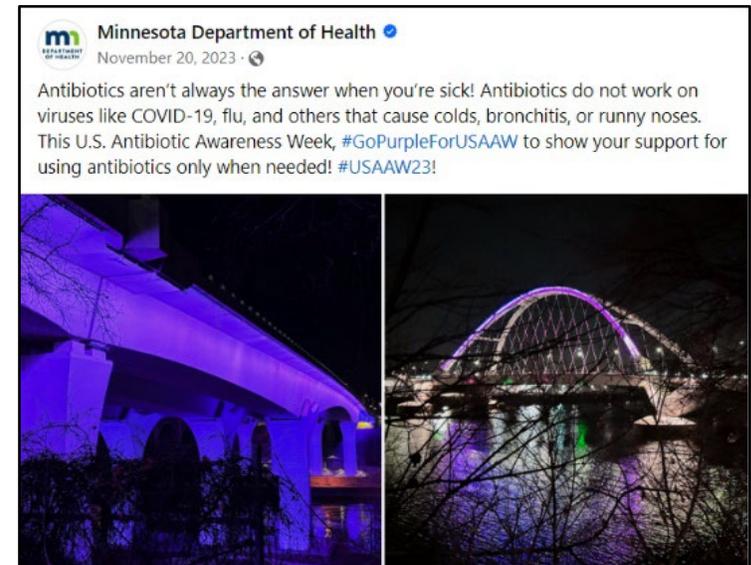
Sharing Stewardship Approaches Across Facilities, Settings, Disciplines

- **Antibiotic Stewardship Honor Roll Program**
 - Three levels provide incentive to improve stewardship over time
 - Acute Care, Critical Access, and Long-term Care Facilities
 - Renewable every two years
- **Antibiotic use measurement with point prevalence**
 - Health care antibiotic use and stewardship annual report
 - Point prevalence surveys ongoing at veterinary hospitals
- **Commitment materials and clinical resources shared among care settings**
 - Posters associated with improved prescribing behavior
 - Tools help facilities to implement antibiotic stewardship core elements/principles specific to their setting



Current Outreach Initiatives

- **Minnesota State Fair Booth**
 - Partnership with MN Pollution Control Agency
 - Over 70 volunteers and 6,000-10,000 visitors annually
- **U.S. Antibiotic Awareness Week**
 - Partnership with CDC and MN agencies: Agriculture, Pollution Control, Board of Animal Health, University of MN, MN Veterinary Medical Assoc.
- **Public Library Display Kits (under development)**
 - Interactive One Health AMR and stewardship resource kits for all ages
- **Legislative Toolkit (under development)**
 - Fact sheets and talking points for legislators and MOHASC members to connect about the risk of AMR and the importance of stewardship



MOHASC In Action



2024 MOHASC Annual Meeting



US Antibiotic Awareness Week
Governor's Proclamation



One Health Exchange with University of MN
Water and Sediment Sampling



One Health Exchange at
Golden Valley Animal
Humane Society

MOHASC Website

<https://www.health.state.mn.us/onehealthabx>

mn DEPARTMENT OF HEALTH MENU I am looking for...

Home > Healthy Communities, Enviro... > Minnesota One Health Antibio...

ONE HEALTH ANTIBIOTIC STEWARDSHIP

One Health Antibiotic Stewardship Home
About Us
News and Events
Conferences and Presentations
Honor Roll
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RELATED TOPICS

Antimicrobial Resistance and Stewardship
Antibiotics Only When Needed (O.W.N.)
Healthcare-Associated Infections
Infection Prevention & Control
Infection Control Assessment and Response Program (ICAR)
Hand Hygiene

CONTACT INFO

One Health Antibiotic Stewardship health.stewardship@state.mn.us

WORKING TOGETHER TO PROTECT HEALTH & PRESERVE ANTIBIOTICS

Minnesota One Health Antibiotic Stewardship Collaborative

A One Health approach recognizes that the health of humans, animals, and the environment is interconnected. Here is how this is defined in the United States:

One Health means a collaborative, multisectoral, and trans-disciplinary approach — working at the local, regional, national, and global levels — with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment. (CDC: One Health)

Issues like antibiotic stewardship require a collaborative effort across multiple disciplines. By using One Health-oriented communication, Minnesota's public and professionals will have the awareness needed to think innovatively and responsibly about approaches to optimizing antibiotic use within each health field.

Watch on YouTube

Antibiotic Resistance and Stewardship Resources for Educators

All ages

- Michigan Antibiotic Resistance Reduction Educational Programs and Resources
- Do Bugs Need Drugs?: Educational Resources
- Oregon Health Authority: Antibiotic Resistance

Antibiotic Resistance and Stewardship Worksheet

Antibiotic Search (PDF)

Superhero (PDF)

Early Childhood

- University of Pennsylvania: Childcare Teacher's Room
- Oregon Alliance Working for Antibiotic Educators

K-12

- Minnesota Department of Agriculture

Late Elementary/Middle School

- Science Buddies: Superbugs and Antibiotics
- BrainPOP Educators: Defeating Bacteria
- Science Buddies: Stopping Superbugs

Middle/High School

NOW OPEN: Lights, Camera, Action for Antibiotic Stewardship

Stories of Antibiotic Use and Resistance

Liz from Minnesota

Minnesota Resident

What are your experiences with antibiotics?

From your perspective, what are the most challenging issues about antibiotic prescribing and use?

What are your experiences with antibiotic resistance or adverse antibiotic effects?

How has antibiotic resistance or antibiotic use affected the way you live your life?

What worries you most about antibiotic resistance?

What would you like to know more about in regard to antimicrobial resistance and/or antibiotic use?

Peter Currie, MD
Emergency Physician, Emergency Physicians Professional Association

Melissa Anacker, PhD
Research Scientist, Minnesota Department of Health – Public Health Laboratory

Minnesota Antimicrobial Stewardship Program Toolkit for Outpatient Clinics

Resources include cough and cold care guides for adults and children, sinusitis and sinusitis fact sheet, viral prescription pad, syndrome-specific antibiotic guidelines, outpatient stewardship summary reports, waiting room antibiotic stewardship posters.

Community Pharmacists: Essential Partners in Minnesota Antibiotic Stewardship

Minnesota Community Pharmacists See a Role in Stewardship

- Over 80% of Minnesota community pharmacists responding to a 2018 Minnesota Department of Health survey believe they play an important role in antibiotic stewardship.¹
- More than 60% of U.S. health care antibiotic use occurs in the outpatient setting.²
- Community pharmacists are some of the most accessible health care professionals and represent the final link in the health care chain before drugs are used in the community.
- Although community pharmacists make up 58% of the pharmacy profession, to date, antibiotic stewardship resources have been largely targeted to hospital pharmacists.³

Antibiotic Resistance

- Antibiotic resistance is one of our most serious health threats.
- CDC estimates that each year in the U.S., 2 million people develop infections from antibiotic-resistant bacteria and 23,000 die from associated causes.
- The major driver of antibiotic resistance is widespread antibiotic use.
- An estimated 30% of outpatient antibiotics are inappropriate.⁴
- Antibiotic stewardship, or the improvement of antibiotic use while effectively treating infections, is essential to combatting resistance.

Other Consequences of Antibiotic Use

- Antibiotics carry a risk of side effects, including allergies and organ damage.
- Because of increasing resistance, some of the only antibiotics available to treat infections caused by resistant bacteria come with a risk of toxic effects.
- Antibiotics have an effect on healthy gastrointestinal bacteria that can last after patients have finished a prescription. This leaves patients at risk for *Clostridium difficile* disease, a toxin-associated illness caused by the *C. difficile* bacterium which is able to thrive after antibiotic exposure.
- C. difficile* can be acquired in the community and in health care settings.

Antibiotic Stewardship

Antibiotic stewardship is the process of improving how we use antibiotics. Key elements of antibiotic stewardship include the six "D's":

- Diagnosis:** using an antibiotic only when clinically indicated.
- Drug:** choosing the right antibiotic for the infection and the patient.
- Dose:** giving the right amount of antibiotic.
- Duration:** giving the antibiotic for the right amount of time.
- De-escalation:** switching to an antibiotic choice that is better targeted to the infection when possible, and switching from intravenous to oral administration when possible.
- Disposal:** appropriate disposal keeps leftover drugs out of the hands of those for whom they were not prescribed and out of Minnesota's lakes and streams.

Minnesota One Health Antibiotic Stewardship Collaborative

Minnesotans from animal, human, and environmental health are working together to be smart about antibiotic use and preventing antibiotic resistance!

www.health.state.mn.us/onehealthabx

mn MINNESOTA

Community Pharmacists: Essential Partners in Minnesota Antibiotic Stewardship (4/30/2018) Page 1 of 2

Only When Needed: O.W.N.

- Public awareness theme for use by partners
- Graphic elements available on MDH website



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- **Minnesota One Health Antibiotic Stewardship Collaborative membership**
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- **Amanda Beaudoin DVM, MPH, PhD**, Inaugural MOHASC Director, currently with Centers for Disease Control and Prevention
- **Minnesota Commissioners** of Health, Agriculture, Pollution Control Agency
- **Minnesota Department of Health HAI-AR staff**
- **University of Minnesota**



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Join us!



WORKING TOGETHER TO
**PROTECT HEALTH &
PRESERVE ANTIBIOTICS**



[MOHASC Partner Information Form](https://redcap.health.state.mn.us/redcap/surveys/?s=XMHL3W4L8HWRKMD8)

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